GAS JOURNAL

VOL. 262. No. 4534 102ND YEAR APRIL 26, 1950

NEGOTIATING MACHINERY

IT was officially announced last week that the Gas Council has, in accordance with the provisions of Section 57 (1) of the Gas Act, 1948, considered the question of establishing national and area joint negotiating machinery in respect of gas staffs who do not come within the purview of the National Joint Council for Gas Staffs. The Gas Council has collected detailed information about the staffs that would come under the jurisdiction of such a negotiating body for senior staffs, and after a careful study of this information has approached the Gas Engineers' National Guild and the National Association of Local Government Officers as the appropriate organisations for consultation respecting the establishment of such machinery, and has agreed with them to draw up constitutions suitable for the purpose.

Almost simultaneously with this statement from Gas Industry House we received a copy of the annual report of the British Gas Staff Association (presented at the annual meeting of the Association last Friday), which contained reference to a tentative agreement to set up a managerial joint council to negotiate for staff in receipt of over £800 per annum, on which the Gas Engineers' National Guild would have had nine seats, Nalgo three, and the British Gas Staff Association three. The Gas Council, according to the B.G.S.A. report, wanted to try out 'conciliation' methods before considering the establishment of 'negotiating' machinery, but the three organisations did not consider that this fulfilled the provisions of the Gas Act, and referred the matter to the Ministry of Fuel and Power who were 'not prepared to take any action as they considered the Gas Council had not closed negotiations.' The three organisations are reported to have agreed to co-operate in setting up 'conciliation' machinery provided the Gas Council undertook to establish machinery for settling conditions of service at the earliest practicable date, and in any case not later than June 30.

Negotiating machinery for manual workers has existed for many years in the National Joint Industrial Council, whose constitution needed comparatively little adaptation to meet the changes wrought by nationalisation. Three months ago the first full meeting was held of the National Council for Gas Staffs, at which the 15 elected members of the staff organisations met the 15 representatives of the Gas Council and area boards. It appeared that provision had been made for consultation and negotiation between the employers and almost all of their employees within the nationalised industry. There remained, however, the small percentage of officials holding managerial or equivalent positions who were not in membership of any of the organisations represented on the National Councils. Many of those who served municipal undertakings prior to nationalisation were members of Nalgo, but senior officials of company undertakings generally remained outside the membership of any body concerned with salaries and conditions until the formation of the Gas Engineers' National Guild. Some engineers and managers are still 'unorganised'; on the other hand, some are known to be members of two or more organisations, and the Gas Council has decided to consult only with the G.E.N.G. and Nalgo after a full examination of the present position. Much has been achieved in regard to terms and conditions of employment of the industry since vesting day—still less than a year ago—and the announcement that steps are being taken to close the gap at the upper end of the scale cannot but be welcomed.

THE WYTHENSHAWE SCHEME

EIGHT months have elapsed since we last recorded that the £5½ mill. district heating scheme for the Wythenshawe estate at Manchester was in danger of abandonment unless a subsidy was provided by the Government. At that time the Manchester Corporation was faced with two major difficulties arising from the attitude of the British Electricity Authority towards the tariff rate at which it would purchase residual electricity generated by the two thermal electric power stations in the scheme and from the short supply of turbo-generators. Councillor J. E. Fitzsimons, Chairman of the Wythenshawe Estate Committee of the Manchester City Council, has now announced that the Ministries of Health, Fuel and Power, and Works have agreed to meet a deputation of four representatives from the Corporation's Housing and Wythenshawe Estates committees to discuss the scheme. He provided at the same time further details of the difficulties with the B.E.A. The Corporation, he said, had wanted the B.E.A to buy the residual current for use in the national grid at the same price at which they would

sell it to the Electricity Board, but no agreement had been reached by the two authorities. These differences, however, had now been cleared up and a stage had been reached at which every aspect of the scheme could be discussed with the Ministries concerned.

Mr. Fitzsimons reiterated that it was felt that it was not right that a single local authority should be involved in the risk of an experiment which, if successful, would prove of great benefit to the whole country. The outstanding point was that the Government should guarantee the Corporation against loss. This last remark is significant. It means that in spite of the fact that what we assume to be a reasonable agreement has been reached with the B.E.A., the Corporation is still uncertain that the project can be made self-supporting. It was originally estimated that the service could be made available to householders at a weekly cost of 7s. 6d., to which there has to be added, of course, some two or three shillings a week for cooking and topping-up in cold weather. It is obvious that no tenant would be prepared to pay a greater charge. What then does this latest development mean? Even if it is admitted that the scheme is in many ways a prototype and that later schemes might be less expensive, it proves that neither technically nor economically can district heating provide a better service than that offered by our own industry.

ABSTRACTION

THE Editor of *Chimie et Industrie* returned last month to the question of documentation—the preparation and distribution of analytical abstracts of publications of all sorts relating to a particular branch of science or technology. His remarks were based upon a lunch-time discussion by the French Society of Industrial Chemistry on whether it was possible to rationalise this function. The opening speaker was M. Jean de Laclémandière, chief of this service of the Renault factories. He said that the establishment of a really useful documentation appeared to the uninitiated a relatively simple job, even a somewhat mechanical business. He showed, however, in what various forms it could be dressed, what was expected of it according to whether it was addressed to the research worker or to the technician. The former wishes to be informed in a few lines of what has appeared reserving to himself the choice in the mass of inevitably heterogeneous documents noted, while the latter requires—and as early as possible—a selection of substantial analyses of the most notable documents. In so vast a subject as the whole range of industrial chemistry it is easy to see what enormous demands—linguistic, scientific, and technical—are made on the abstracting and editing staff. At rock bottom it is a question of money and money's worth.

How do these considerations apply to our own much more limited subject of the science and technique of gas manufacture, distribution, and utilisation? It must be admitted that little or nothing has been done in this direction, and one wonders whether the Gas Research Board has anything in mind—possibly through its Bureau of Information. It is possible, of course, that the periodical issue of abstracts covering this limited field would appeal to too few subscribers to pay its way. It is possible that it should be undertaken as one of the services rendered at a nominal, or at all events unremunerative, charge by the board to the personnel of the industry and to be reckoned as a legitimate charge on the funds of the board. On the other hand it may be held that the Fuel Abstracts issued by the D.S.I.R. Fuel Research Board are sufficient for the purpose. They seem to appeal to a wide clientèle, though we wonder how many of the recipients of these abstracts in fact read them, and the abstracts could without question be improved in presentation. The publication in its current form is difficult to read and uncomfortable to handle. It reaches its public a full month late and the abstracts themselves are, at best, three months out of date. One would not be inclined to say much about this, recognising the difficulties of compilation and printing, if the abstracts were presented in readable type, bound as a volume which did not require both hands to keep it open while the reader's mind was endeavouring to assimilate its contents.

AN ANCIENT MONUMENT

IN the plans for the construction of new plant at Caen, the engineers have come to grips with an artistic problem sufficiently rare in the annals of the gas industry to merit mention. On the site of the works there is a chapel, classified as an historical monument and which was not spared by the bombardments of 1944 in spite of its symbolic name, Sainte-Paix. The Ministry of Fine Arts has indicated a desire to carry out the restoration of this monument and to see it separated from the works to permit the access of visitors. It dates from 1061 when William the Conquerer erected a chapel dedicated to St. Mark to perpetuate the memory of a peace conference which was held at Caen. The Duke brought there the principal relics of the province to receive the oaths of the Norman barons, after which it was renamed St. Mark of All Saints or Sainte-Paix des Toussaints. After some vicissitudes it fell into the possession of an English company who erected a works in 1838 on the site in which it was included. This company respected what was left of the chapel and preserved the remains. Some interesting details and a photograph are published in the February issue of the *Journal des Usines à Gaz*.

TIMBER PRESERVATION

THE British Wood Preserving Association, which is a non-profit making organisation for the improvement of wood preservation, has been in existence for some 20 years. Before the war, when supplies of softwood were abundant and prices much lower than today, the activities of the Association were confined almost entirely to giving technical information on the creosoting of sleepers for the railway companies, poles for the General Post Office, and the preservation of estate timber. Wartime needs of the Government and of the Ministry of Supply in particular, however, necessitated the large scale reorganisation of a major part of the wood preserving industry, coupled with the extensive introduction of clean, yet efficient, chemical preservatives. It is now apparent that for economic reasons softwood timber may be in short supply for a number of years—indeed perhaps for a generation. Because of this, the B.W.P.A. has undertaken the responsibility of advising timber-consuming industries as to the most suitable preservatives and methods of treatment in order to obtain the greatest possible extension of life for all softwood imported into Great Britain. In a subsequent issue we shall publish a brief report of the first annual luncheon of the Association held on April 19 at the Savoy Hotel and attended by representatives from Government Departments and from timber-consuming industries, as well as by members of the British Wood Preserving Association.

WHOLE-HOUSE HEATING

WHEN we last mentioned the difficulties inherent in the Wythenshawe district heating scheme we stressed the importance of an early report on the amendments to the whole-house heating experiments at Abbots Langley. It is a coincidence, therefore, that we publish today news of latest developments at Wythenshawe and of results obtained from the whole-house warming scheme undertaken by Radiation Ltd. at Stanmore. The Stanmore project was initiated in the autumn of 1948, when Radiation Ltd. completed the building of a pair of houses, fully equipped to investigate the merits of whole-house heating. These houses and the heating systems in them were described in detail in the *Journal* of April 6, 1949. Radiation have now published a 24-page illustrated booklet, 'The Stanmore Development,' which sets out, in addition to an outline of the appliances employed, some of the results obtained and experiences gained. Findings of interest which we note include the fact that the efficiencies of the house warming appliances are 2½ to 3 times that of the open coal fire, and it is of interest that the anticipated flexibility and high standard of performance have been proved in practice. The booklet is factual without being elaborate; in the hands of the architect and builder it will provide stimulating thought on what we have termed 'a far-seeing development.'

CLEAN COAL

RECENT recriminations on the cause of dirt in coal, which have bulked so large in both Parliament and the Press, reached a climax when Mr. S. Walton-Brown, National President of the British Association of Colliery Managers, asserted at the Association's annual conference that 'almost 33% of the additional gross output obtained since nationalisation of the coal mines has been stone.' Such a statement requires investigation. According to the *Sunday Times* a senior official of the Ministry of Fuel has said that there is no statistical evidence for Mr. Walton-Brown's statement, which was one of opinion only. Published figures, nevertheless, show that if the years 1946 and 1949 are compared there was an increase of 21.5 mill. in the tonnage produced and an increase of seven mill. tons in the amount of dirt removed from coal in the latter year. The Ministry has given as the main causes for complaint of coal quality the failure of washery capacity to keep pace with increasing numbers of coal-cutting machines and mechanical conveyors, and a marked increase in shot-firing. It is also admitted that the miners could do more to prevent the loading of dirt underground which places a greater strain on the workers on the picking belts, who are often not highly experienced. This opinion is of interest since it places much of the responsibility where it lies, underground.

'VITAL' ORGANISATIONS

THE annual reception and dance of the London and Southern Junior Gas Association at Caxton Hall, London, on Friday last was, as usual, an altogether happy affair, with, again as usual, the spirit of friendliness and good fellowship dominating the whole. During the evening Mr. F. M. Birks, Deputy Chairman of the North Thames Gas Board, Vice-President of the Institution of Gas Engineers, as guest of the Association, made, at the request of the President, Mr. H. Savill, a short speech in which he expressed his sincere regard for the work the Association has carried out over the years to such good purpose. Actually, the first paper which Mr. Birks wrote on a gas subject was given to the Association in 1923. 'I know personally,' he said, 'a number of your members; and from my intimate knowledge of their work I appreciate that their contributions to your Association are not only a great help to it as such, but a help also to the gas industry in the larger sphere.' Mr. Birks went on to express the opinion—which he emphasised was purely personal—that much closer relationship between the Institution and the Association is not at present possible because the Institution is bound by its Charter to require certain qualifications for membership. 'I am, however, confident,' he said, 'that as times goes on the general trend will be towards an even closer relationship between both bodies, and that the Association will grow in strength because it fulfils a useful and vital purpose.' It is, of course, a fact that the relationship between the Institution and the Junior Associations generally has steadily become closer. As the Juniors advance in years, though they may join the Institution, they continue to take an active part in the Association's proceedings. The Institution has cemented the relationship between the Junior Associations and itself by representation on the Council—definite proof of the bond between them.

A STURDY INSTITUTION

ALTHOUGH it ranks sixth in seniority among the principal engineering institutions, the Institution of Chemical Engineers, founded in 1921, with Sir Arthur Duckham as its first President, has attained a membership, covering five different classes, of 2,338, an increase of 212 over the past 12 months, and is thus not very far behind the Institution of Gas Engineers, established 58 years earlier, several of whose members, being chemical engineers specialising in particular branches of the science, are also members of the younger organisation. The Institution's annual dinner, revived in 1949 after an interval of nine years, was held again at the May Fair Hotel following the 28th annual corporate meeting, on April 14, the principal guests being Sir Walter Benton Jones, who proposed the toast of the Institution, and Dr. D. T. A. Townend, President of the Institute of Fuel, and Mr. A. P. L. Blaxter, Master of the Worshipful Company of Founders, who jointly responded to the toast of the guests. Mr. H. W. Cremer, Immediate Past President, proposing the latter toast, said that the Council had for some time had under consideration the question of chemical engineering research. It had been felt that there was little or no co-ordination in this respect, with the result that some needless overlapping had probably occurred, while some fundamental researches had been untouched. As a result of representations made on behalf of the Institution, the Council of the Department of Scientific and Industrial Research has set up a committee to go into the whole question. The committee would survey what work was now going on, what further work was desirable, and would recommend where and how this might be done. Mr. Cremer, himself, is the Chairman of the committee, on which the following members are also serving: Professor T. R. C. Fox, Professor F. H. Garner, Mr. H. Griffiths, Professor D. M. Newitt, Mr. J. A. Oriel, Mr. Stanley Robson, with Dr. A. Parker, Director of Fuel Research, as one of the representatives of Government scientific departments.

PLANS FOR PUBLICITY

THE first indication of how the Gas Council is re-shaping its publicity policy was contained in an address by Mr. R. J. Gregg, Publicity Manager to the Gas Council, to the Southern District (Kent Area) Circle at Folkestone on April 12. The title of the address was 'The Inseparables,' the Siamese twins being sales and publicity, and it is the first of a number of papers to be given by Mr. Gregg to various Circles throughout the country. As a source of hard facts the address was disappointing, but it undoubtedly served as a pointer towards things to come. No doubt some evasiveness was necessary, for the industry's publicity services are in a state of considerable flux and it will be some time before the Gas Council's part in forthcoming campaigns is fully crystallised. In general, however, it would appear that the Council will be less of a stationer's shop and more of a consulting and co-ordinating body. While area boards will be responsible for their own publicity, the Council's task will be to ensure that one board's approach will be in some harmony with that of the board next door. In the past local publicity has been vastly contradictory, and so confusing to the public. In future, it is hoped, these diverse angles and varying facts will be directed into a broad stream which, although allowing independent movement and individuality, will nevertheless conform to a predestined current. Certain of the Council's publicity services are likely to undergo considerable expansion. For example, films are to be distributed more widely and evenly. The present total of 70-80 projectors of various kinds and ages in use is, Mr. Gregg suggested, hopelessly inadequate;

he visualises a set of twin projectors for every 250,000 consumers, and a stronger attack on the visual education potential in schools. Again, the unfortunate losses incurred by the production of first-class books and publications which were not properly utilised by the industry are to be avoided in future. National distribution is planned, based on a predetermined minimum sale. All this is encouraging. It appears that much of our future publicity will be based on economic factors and will have to justify its existence in terms of direct returns. We are more concerned with the area board's individual publicity activities. If—as we hope—general standards are to be raised, each board must have competent machinery to produce this publicity. In some areas this exists; in some it does not. We do not think we are being unduly pessimistic in prophesying some trouble here. The Folkestone meeting was interesting for another reason. This was, to our knowledge, the first occasion on which Mr. Gregg has spoken in his new capacity, and in view of his former reputation as an orator extraordinary we may be forgiven if we admit to a little curiosity concerning his method of presentation. Would it be modified or would instinct prevail? We hasten to reassure enthusiasts of Mr. Gregg's delivery. The Greggorian eloquence is unabated, and we are hopeful that this application of high pressure will eventually produce a publicity service to the industry in keeping with future needs and past reputations.

Letter to the Editor

STEAMING AND THERMAL EFFICIENCY

DEAR SIR,—Your comments on Mr. Hawthorn's paper and the discussion are both interesting and worthy of deep consideration. Many points you raise and elucidate will meet with general agreement, but there are others on which differences of opinion will be held.

For example, your picture of the counterflow of steam to coke suggesting almost complete interchange of heat seems to ignore that only the outside surfaces of the coke lumps can play any part in water-gas production. Coke being a poor conductor, the heat in the inner mass of the coke is slow to travel to the face, and in any case, once the coke face has lost its incandescence no water gas reaction will take place.

The introduction of the 'steaming chamber' was to increase the exposed coke surfaces and this definitely improved water gas production, but if your counter-current theory was sound a 'steaming chamber' would be unnecessary. In my opinion a calculation of the sensible heat in coke based on temperature and weight is very much above the actual heat which can be made use of in the water gas reaction, and potential water gas yields based on a straight calculation can be very misleading.

In regard to the factors which influence the calorific value of gas, it is our experience with horizontal retorts that an increase in throughput results in a lowering of calorific value, and I suggest that increased throughputs result in lowering the internal temperature of the retort. With verticals I also assume that temperature will influence calorific value, but here we have the complication of steaming; and the point I wanted to make in my previous letter was that both excess steam and water gas reduced the internal temperature of a continuous vertical retort and that a reduction in steaming more than compensated for the cooling due to the extra coal throughput, with the result that a higher final internal retort temperature was obtained and the calorific value of the resultant gas was raised.

In addition to temperature I think the presence of steam influences both the thermal yield and the calorific value of the coal gas from continuous vertical retorts.

With horizontals with Yorkshire coals it is normal to produce gases of 620 B.Th.U./cu.ft., but on continuous vertical retorts the calorific value of the coal gas calculated from the coal gas-water gas mixture is never near this figure. In both horizontals and verticals the combustion chamber temperatures are similar.

It is significant that in some of the larger undertakings there is a move to cut steaming down to the absolute minimum, and in one case at least the declared calorific value is being obtained by dilution with externally produced diluents. This cuts right across the inference to be drawn from your statement that extra water gas made in continuous vertical retorts after the sensible heat of the discharge coke has been exhausted is an economic proposition.

There are many indirect factors which play a part independent of the extra heat necessary to be developed in the producer—for instance, there is usually lower quality water gas produced which with unconverted steam passes through the charge and the thermal yield from the coal is lowered. This statement is based on personal observations and is supported by my interpretation of carbonising results with continuous vertical retorts given in D.S.I.R. paper No. 15.

In this paper I have ignored the results from the unsteamed charge, because, owing to the difficulties experienced, also the very limited period of the test, the results appear abnormal, especially when they are compared with the results from the same coal when carbonised in an inclined retort.

The thermal yield/ton in each case was 59.4 and 68.4 respectively which in my opinion requires some explanation.

For my purpose I take as the basis for comparison the figures relating to the test using 5.05% steaming and by calculation give the calorific value of the 'extra' gas produced and the percentage steam unconverted when the steaming rate was raised from 5.05% to 12.54% and 20.21% respectively.

Steam %	Steam undecomposed % of steam added.	'Excess' gas calorific value.
5.05	17.4	?
12.54	48.8	300 B.Th.U./cu.ft.
20.21	61.2	268

With 20.21% steaming the resultant gas has a calorific value of 480 B.Th.U./cu.ft.

In my opinion the low quality of the 'excess' gas with 20.21% steaming can be due to either insufficient incandescent coke zone for steam conversion to water gas, a lower thermal yield from the coal charge itself due to the presence of volumes of unconverted steam and its effect on carbonising conditions, or a combination of both factors.

In regard to grand strategy, by which I presume you mean some policy determined by a formula taking into consideration the relationship between the potential heat in the original coal and the heat usefully employed by the two main products of carbonisation—*i.e.*, gas and coke—your illustrations indicate the possible lines to be taken to arrive at a decision. It is a very complicated problem and while on paper an attractive formula might be found, it has then to be converted into a practical proposition; and I think we shall find that markets and salesmanship are dominant factors.

The gas industry must provide for *existing* fuel markets, both gaseous and solid, and must adjust production of either gas or coke to meet market demands. It is useless adopting total gasification unless a market exists to consume all the gas produced, especially if it means withdrawing from an existing solid fuel market. The salesman must create the market and the system of production will follow the trend of events. Finally, in regard to your comments on the question of benzole extraction, 'that it is a little odd to take out benzole only to add petrol for enrichment,' I could not be more in agreement with you, and I am astonished that you could have formed that impression from my two letters.

My first letter tried to prove that to leave benzole in gas to carburet diluents was not sound economics. My second letter suggested that if it was a question of increasing thermal production *at any cost*, one way of doing this was to produce low grade gas and carburet the purified gas with petrol. No mention was made that this gas should first be stripped of its benzole.

Yours faithfully,

F. FIRTH.

3, West Park Avenue, Leeds, 8.
April 18, 1950.

Personal

Mr. **W. J. Parker** has accepted the appointment of intelligence officer with the British Coke Research Association.

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Dr. **E. H. T. Hoblyn** has been appointed Director of the British Chemical Plant Manufacturers' Association, in succession to the late Mr. N. Neville.

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Councillor **E. Bayliss,** Chairman of the North Thames Gas Consultative Council, has been appointed a Justice of the Peace for the County of London.

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Mr. **Rae P. Normand,** Secretary of the Evening Star Lodge, has moved office to: c/o, Walter King, Ltd., 11, Bolt Court, Fleet Street, E.C.4 ('phone CENtral 2236-7).

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Mr. **A. Whitaker,** Chief Engineer in charge of research, development, and design for Ascot Gas Water Heaters, Ltd., is one of five newly appointed members of the Council of Industrial Design.

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Mr. **W. A. Pask,** Sub-Divisional Manager of the City of Leicester Sub-Division, East Midlands Gas Board, has been appointed to a similar position in the Leicestershire and Rutland Sub-Division, with which the City of Leicester Sub-Division will be incorporated on May 1.

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Mr. **Alec Webster** has resigned his position as Safety Officer to the Association of British Chemical Manufacturers, in order to establish a private consulting practice. He will advise on all aspects of industrial safety, including fire protection and the storage of chemicals, at 181, Mutton Lane, Potters Bar, Middlesex.

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Mr. **C. A. Deas** has been appointed by the Eastern Gas Board to the position of Area Coke Manager, with effect from April 3. He is responsible to the board for the administration and co-ordination of coke sales throughout the area, together with the technical and commercial work necessary for the expansion and development of coke markets within the board's area. His office is at Woodall House, Wood Green, N.22. (Telephone : Bowes Park 1234.)

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NORTH EASTERN APPOINTMENTS

The North Eastern Gas Board has made the following appointments:—

Headquarters: Coal Officer, C. Cairns; Public Relations and Publicity Officer, C. L. Maunder (effective from June 1).

Leeds Group: Deputy Group General Manager, P. Sumner; Group Distribution Engineer, R. Harris; Group Sales Manager, A. J. Winter.

Bradford Group: Deputy Group General Manager, F. H. King; Group Distribution Engineer, G. Griffiths; Group Sales Manager, F. Roberts; District Engineer and Manager, Shipley and Bingley, H. B. J. Hart.

Wakefield Group: Group Distribution Engineer, F. Robson, M.C.; Group Sales Manager, R. Ward; Group Engineer, G. Hudson; District Engineer and Manager, Ossett and Dewsbury, H. L. Bateman; District Engineer and Manager, Pontefract, Knottingley, Normanton, Featherstone, B. Hudson; District Manager, Castleford, Rothwell, Garforth, Whitwood, Kippax, Sherburn, R. A. Walker.

Huddersfield/Halifax Group: Sub-Group Engineer and Manager, Halifax, J. MacLusky; Sub-Group Engineer and Manager, Huddersfield, H. Singleton; Group Distribution Engineer, R. H. O'Neill; Group Sales Manager, E. S. Carter.

York/Harrogate Group: Group Engineer, R. S. Cureton; Group Distribution Engineer, A. J. Millican; Group Sales Manager, N. A. Walker; District Engineer and Manager, York, F. H. Nicholls; Distribution Superintendent, York, E. C. Burkett.

Hull Group: Deputy Group General Manager and Group Engineer, J. E. Holliday; Group Distribution Engineer, J. Dean; Group Sales Manager, J. Harwood; Works Engineer, Hull East, D. I. Moody.

SCOTTISH APPOINTMENTS

The following appointments have recently been made in Scotland :—

Mr. T. P. Napier, Assistant at Kirkcaldy, to be Engineer and Manager at Forfar undertaking, Dundee Group, Central Division, in succession to the late Mr. A. W. Farquhar; Mr. T. A. Rowan, Engineer and Manager at Grangemouth, to be Engineer and Manager at Vale of Leven, Glasgow and West Division, in succession to the late Mr. A. R. Anderson; Mr. D. Wilson (Saltcoats), to be Manager at Skelmorlie, Greenock Group, South West Division; Mr. J. Walker (Dundee), to be Technical Assistant (Distribution), and Mr. J. G. McEwan, to be Sales Officer at Stirling, Perth Group, Central Division; Mr. **W. Easton,** to be Technical Assistant at Hawick, Edinburgh and South East Division, in place of Mr. J. McDonald, who has taken up a similar post at Kirkcaldy, Fife group, Central Division; Mr. D. C. Brown, foreman at Kelty, to be District Manager at Maybole, Kilmarnock group; and Mr. J. S. Gray (Ardrossan), to be Engineer and Manager at Stranraer, Kilmarnock group, South West Division.

Diary

April 27.—Midland Junior Gas Association : President's Day. Oxford.

April 27.—North Thames Gas Consultative Council : St. Ermin's Hotel, Westminster, S.W.1. 2.30 p.m.

April 27.—Institute of Fuel : Annual General Meeting, Connaught Rooms, Great Queen Street, 11 a.m. Presidential Address of Dr. D. T. A. Townend. Annual Luncheon, 1 p.m.; principal guest and speaker, Sir Harold Brown, G.B.E., K.C.B., Chairman, Fuel Research Board.

April 28.—Manchester District Association of Gas Engineers: Meeting, Engineers' Club, Manchester. Presidential Address of N. G. Appleyard.

April 28.—Northern Junior Gas Association : 'A Modern Steam Raising Plant,' J.T. Lewis (Newcastle Division), 'Concerning Gas Quality,' W. E. Whitney (Stockton Division), 'Questions for Examinations in Higher Grade Gas Engineering and Manufacture,' A. K. Stalker (Sunderland Division). Seaburn Hotel, Seaburn. 2.30 p.m.

May 4-5.—Eastern Association of Gas Engineers and Managers: Spring Meeting, Felixstowe.

May 5.—North of England Gas Managers' Association : Annual General Meeting. Address by C. H. Chester, O.B.E., President of the Institution of Gas Engineers. County Hotel, Newcastle-upon-Tyne, 2.15 p.m.

May 6.—Manchester District Junior Association of Gas Engineers: Visit to the Linacre undertaking, Liverpool. 'Carbonising in Continuous Vertical Retorts,' G. M. Brown (Liverpool).

May 12.—London and Southern Junior Gas Association: 'Carbon Monoxide,' F. E. Mills and F. C. Smith (Watson House). Lecture Theatre, North Thames Gas Board, 178/180, Edgware Road, W.2. 7 p.m.

May 19.—Scottish Junior Gas Association (Western District): Visit to Newton Chambers & Co., Ltd., Thorncliffe, Sheffield.

May 11.—London and Counties Coke Sales Circle : Annual General Meeting. Gas Industry House. 2.30 p.m.

May 17.—London and Southern Junior Gas Association : Visit to Shell Refineries, Shell Haven, Essex.

May 18-19.—Wales and Monmouthshire Association of Gas Engineers and Managers: 45th Annual Meeting, Tenby. (First day social functions; second day business).

May 23.—Southern Association of Gas Engineers and Managers: Spring General Meeting. 'Forty Years of Reinforced Concrete with Special Reference to Recent Developments,' E. O. Rose (Divisional Engineer) and W. T. Gedge (Divisional Constructional Engineer, Tottenham Division, Eastern Gas Board. Connaught Rooms, London.

June 5-9.—Institution of Gas Engineers: Annual General Meeting, Bournemouth.

Priority Schemes in the Northern Area

Development Programme Placed Before Consultative Council

A MAJOR development programme, approved by the Northern Gas Board, was submitted to the fourth meeting of the Northern Gas Consultative Council in Newcastle on April 3, under the chairmanship of Alderman Joseph Hoy, of Sunderland. The programme, which was published in detail in the *Journal* of February 8, covers schemes in hand or to be undertaken for the extension and improvement of gas supplies and for the more economical manufacture and distribution of gas to the public.

Mr. E. Crowther, Chairman of the Northern Gas Board, attended the meeting to explain any details of the programme to members and in welcoming him **Alderman Hoy** stated that the plan would cost thousands of pounds but they must bear in mind that it was aimed at achieving the object of nationalisation—the complete integration of the industry.

'I must warn you in regard to the programme not to be parochial in your outlook towards it,' he said. 'Members of the council are drawn from every part of the area and may be inclined to consider what is being done in their own districts only. We cannot afford with a scheme of this size to be so limited in our outlook. We must look at it from the point of view of the area organisation as a whole. I am satisfied that if we bear this point in mind we can succeed in being of some real assistance to the board in its work.'

Mr. **Crowther** said that the programme at first sight almost looked as though it was too ambitious in a time when the country was passing through economic difficulties. 'I want to say first and foremost,' he said, 'that every scheme placed before you has had to pass one of two tests. Either the work was necessary to maintain supplies to consumers or, alternatively, it presented so strong a prospect of economies as to be capable of more than paying for itself immediately.'

Newcastle's Urgent Needs

Long-term schemes had been shelved unless they were imperative to maintain supplies to the district. He quoted the position in Newcastle, where demand had risen to twice its pre-war level and they were obliged to build in order to ensure enough gas for everyone who wanted it. Bad weather during one or two short terms of cold weather had resulted in them having to reduce pressures on the district to the annoyance of consumers. In spite of that the quantity of gas sold had attained new levels, higher than ever experienced before. Remembering how difficult it was to construct any plant during the war years and what a long time it took to build since then, they might be inclined to wonder how they had managed to deliver these large quantities of gas with relatively little inconvenience or interruption of supply.

'On top of all these schemes, there are a great many others being carried out, such as mains laying work to new housing estates, a great deal of capital has been expended on hire-purchase apparatus, and there is the constant run of maintenance and repair work at all stations,' he continued. 'Indeed, some of the latter had fallen into arrears prior to vesting day because some of the smaller undertakings were so short of capital. On the other hand, many of the schemes were initiated before vesting day by companies who had access to sufficient capital to permit them to carry them out and who realised the necessity of development work. In those cases we are simply following on with the schemes they initiated.'

They were also setting up welfare, safety, and health schemes for all persons employed and the establishment of a suitable training scheme was also engaging the thought of the board.

Alderman **L. Taylor,** of Middlesbrough, referred to the fact that at Middlesbrough, Dorman Long had stated that they did not intend to renew their existing contract after 1955 and alternative sources of supply were being explored. 'The Steel Bill is on the Statute Book,' he said, 'and may be implemented, and Dorman Long's will then become part of the Steel Board. While it may be their desire to end the contract it may not be that of the Steel Board. They may say that it is in the best interests of the community that Middlesbrough should receive surplus gas as at present. Has that aspect been considered?,' he asked. Mr. Crowther replied that the board was not unaware of the possibilities which might emerge under state ownership of the iron and steel industries, but at the moment their affairs were with Dorman Long and they could not go beyond them. He understood from the N.C.B. that the Fishburn project would go ahead and the quantity of gas from these ovens would be sufficient to replace the gas bought from Dorman Long if that supply ceased.

Sewage Gas

The Chairman reported on a query which had been made by a council member, Mr. R. N. Carr, of Carlisle, on the utilisation of gas from sewage disposal works. Mr. Carr had been approached by the Engineer of Carlisle City Council to utilise such gas and required information as to whether there were any schemes of a like nature in operation in the Northern area.

The Chairman had informed Mr. Carr that in many places use was made of gas collected from sludge digestion tanks for lighting, generation of electricity, firing gas boilers and working gas engines, but he was not aware that it was used in any part of the area to augment a town supply. He had taken up the matter with the Chairman of the board.

Mr. Crowther said sludge digestion gas, which was chiefly methane, was collected in a number of places up and down the country; it was generally used at the places where it was produced for steam or power generation. The high calorific value of the gas and the necessity to purify it, would require it to be sent to the gasworks for blending with other gas before it would be delivered to the general body of consumers—it could not be introduced into the nearest point of the general gas mains system. On the other hand, its high calorific value would be valuable for the enrichment of other gas produced at the receiving gasworks. This would be particularly true where water gas is made as it would replace some gas oil as an enriching agent. Mr. Crowther thought that if the supplies of the gas were regular, the quantity worthwhile, and if the gas could be brought into the works economically, it could be quite an interesting proposition. He understood that the scheme was only in embryo at the sewage works and the matter would be investigated further with the Carlisle City Council. He thanked the consultative council for bringing the matter forward.

The Chairman reported that since the previous meeting four district committees had been inaugurated in Penrith, Workington, Hexham, and Blyth Divisions. In each case, Alderman Hoy said, the Divisional General Manager attended the meeting and gave a comprehensive survey of the organisation and administration of his division, together with other information, which had provided the committees with an excellent background for the commencement of their work.

COMPANY NEWS

Metropolitan Gas Meters, Ltd.—Profit for the year ended September 30 is £7,977, compared with £9,568 in the previous year. An Ordinary dividend of 15% has been declared, the same as last year.

Parkinson and Cowan, Ltd.—The Directors of Parkinson and Cowan, Ltd., are recommending to their shareholders the payment of a dividend of 7%, less tax, on the Ordinary stock for the year ended December 31. Consolidated gross trading profit is £308,673, compared with £299,143 for the previous year, and net profit, after providing for taxation, &c., amounts to £80,307, compared with £94,186 for the previous year.

Glover and Main, Ltd.—Consolidated profit for 1949 amounts to £641,801, compared with £623,249 in the previous year. After providing for depreciation, income tax, profits tax, &c., there is a net profit for the group of £280,062, against £263,952 in 1948. The net profit of the holding company is £117,073, compared with £66,912 in the previous year. After payment of a final Ordinary dividend of 10%, plus a bonus of 7½% on the £495,000 Ordinary shares, as increased by a 10% capital bonus issue last September, making, with the 5% interim on the £450,000 capital, 22½% for the year, there is a balance to be carried forward of £67,186, compared with £88,451 brought in.

Increased Integration of Research Work

Annual Meeting of Gas Research Board

THE Ninth Annual General Meeting of the Gas Research Board was held at Gas Industry House on April 19, under the Chairmanship of Dr. H. Hollings, Chairman of the Council.

The **Chairman** said that according to the Articles of Association of the Gas Research Board, the President, Viscount Falmouth, was due to retire. They had been fortunate in having the value of Lord Falmouth's guidance and it was with great pleasure that he was able to announce that he was willing to serve for a further period.

Mr. **R. B. Potter** seconded the proposition, which was carried.

Lord **Falmouth,** in acknowledgment, said it was a great honour to have been elected again to be President of the Board. The Gas Research Board was going through a difficult period, and he would be happy to render what assistance he could.

The Chairman proposed the re-election of Mr. C. H. Chester as Vice-President for the coming year, based on the nomination of the Institution of Gas Engineers, of which body Mr. Chester was the President. The proposition was seconded by Mr. **H. S. Cheetham,** and adopted.

The Chairman then proposed the election of Sir Harold West as Vice-President, on the nomination of the Society of British Gas Industries, to succeed the Earl of Limerick. This was seconded by Mr. N. Hudson, and approved.

The Chairman reported that one-third of the members of the Council were due to retire by rotation, comprising three nominees of the Institution of Gas Engineers, Messrs. J. T. Haynes, N. Hudson, and T. F. E. Rhead. The Institution has nominated the same three members for a further period of three years. Two representatives of the Society of British Gas Industries—Mr. T. C. Finlayson and Mr. A. Whitaker—were due to retire. The Society had nominated Mr. L. Walker, in place of Mr. T. C. Finlayson, and had reappointed Mr. A. Whitaker.

The Chairman said that Mr. Finlayson should not be allowed to retire without an expression of thanks for the very great service he had rendered during his nine years' active membership of the Council.

It was also reported that Messrs. Cash Stone & Co. would continue to act as auditors for the coming year.

Annual Report

The 11th Annual Report of the Council refers to loss by death this year of Mr. W. Dieterichs. He had attended meetings of the Council regularly for seven years, and his wise counsel and staunch friendship had been valued very highly.

There have been important changes in the membership of the Board consequent upon nationalisation. The places of a considerable number of undertakings that were formerly members have now been taken by 12 gas boards.

The Council has decided that it will now be appropriate to broaden the basis of individual membership. Hitherto, this has been restricted to the signatories of the Memorandum of Association and to members of the Council during their tenure of office. The Board will now receive applications from others who may be nominated by the appropriate area board representative. It is proposed that such individual membership shall be reviewed after a period of a few years.

The programme of research with which the industry is generally familiar has been continued, with minor revisions where necessary. It is submitted in detail each year to the Department of Scientific and Industrial Research, and last March it was submitted to the Gas Council.

Bituminous Coal

In the last report mention was made of the design of a new high-pressure vessel to permit of further study of the gasification of coal and coke, and of the unfortunate delay in obtaining such apparatus in present circumstances. There is now reason to hope that this vessel may be delivered during the coming year. As soon as it can be erected in the laboratory at Poole it will be possible to make further progress in a study of the behaviour of bituminous coal outside the present range of gas-making coal, in contact with air or oxygen and steam under pressure.

As foreshadowed in the last report, the programme of work upon methane synthesis was brought to a successful conclusion during the year. Full details of the final experiment have been presented to the Institution of Gas Engineers.

The erection was completed during the year of the experimental water gas plant, and at an early date it is hoped to make progress in the study of the effect of preheating the air blast and steam supply.

Good progress has been made in the study of the general problem of the removal of hydrogen sulphide from gas by means of iron oxide, and the interest that this has aroused among gas engineers is very gratifying to the Council.

Towards the end of the year the Council learned of the reorganisation of the work of the Institution of Gas Engineers in connection with the disposal of gasworks effluents and it was decided to set up a new panel to advise upon research on the composition of and disposal of ammonia effluents.

The programme of research in connection with ammonia still effluents has been considered in some detail and it has been decided that in the present work at Leeds particular emphasis should be placed upon the desirability of obtaining more precise chemical knowledge of the constitution of ammoniacal liquor as produced in gasworks. It is perhaps surprising, but nevertheless very significant, that there is such a gap in knowledge relating to some of the oxygen absorbing compounds. It may well be that new analytical methods have to be developed and in this connection use will be made of one or both of the excellent spectrometers available in the Fuel Department of the University. It may be possible to make use also of new knowledge available in the University relative to compounds of clay with some of the possible organic constituents of ammoniacal liquor.

The reconstruction of the headquarters premises at Beckenham is almost complete and the scientific staff working in London, together with the Intelligence Section and the secretarial staff, are now housed under one roof.

The Council agreed to a request from the Council of the Institution of Gas Engineers that Dr. W. T. K. Braunholtz, O.B.E., who had been Secretary of the Board since its inception, should be released in order that he might devote the whole of his time to the increasing work of the Institution. In recording this, it is desired to express warm appreciation of the services rendered by Dr. Braunholtz during the difficult early years of the Board's life. Mr. A. J. Penston was appointed Secretary as from May 1, 1949.

The report includes the usual financial statement. The outstanding feature is that as a result of the decision of the Gas Council to increase their contribution from £40,700 to £47,000 it has been possible to close the year with only a very small deficit.

The Chairman presented the report in summary and moved its adoption.

Mr. **J. E. Davis** seconded, and the report was adopted without discussion.

The Director's Report

Dr. **J. G. King,** the Director, then presented his report for the year 1949, an 'annual report on scientific progress.' He said that since discussion was not contemplated, the report had not been issued in advance of the meeting.

The report was arranged in the same logical order as before; only those minor changes had been made which had been necessitated by programme changes.

The first section was introductory, the second section contained research projects which concerned those procedures which may occur in the gasworks, *i.e.*, in gas production, purification and storage. In their study of processes of gasification they had increased their knowledge regarding the technique of the gasification of coal in a fluid state, to an extent which suggested that this technique might become an important competitor with the procedure which involved the more conventional gas generator, and which they had developed experimentally from consideration of the Lurgi steam-oxygen process.

In their studies of methane synthesis as a process of gas enrichment, they had reached a stage at which full-scale experiment at one works could be contemplated in order to obtain economic data. It was indeed hoped that a full-scale trial would emerge from this work.

The water-gas process was to be re-examined—this time using a system in which the air and/or steam might be preheated to 800° C. The construction of the plant and ancillary apparatus had been completed during the year and

work actually started in late December. It was now active.

In the field of gas purification from hydrogen sulphide, using the oxide box technique, they felt that they had made a notable advance in identifying the causes of hardening of oxide, and in suggesting means for its avoidance. The application of this new knowledge might well involve some re-arrangement of the sequence of purification plant and perhaps some additional control of conditions such as the moisture content of the oxide, but the way was already clearly indicated how hardening could be avoided and how a high state of activity of the oxide could be maintained during its whole life.

The gasholder experiment, in which they set out to measure wind stresses on a spirally-guided holder, had now reached the stage of full equipment of a holder (at Brentwood) with the necessary apparatus for scientific measurement. Preliminary observations had been made since the end of the year; these held the promise of correlation with the model-scale experiments originally conducted at the National Physical Laboratory (GRB. 28.).

Ammonia Effluents

Other projects in this section and in Sections III and IV (Coke and Refractory Materials) had been continued from the previous year. In Section V, Ammonia Effluents, considerable expansion of the work was under consideration at the end of the year. This had now been arranged; laboratory work had been expanded and field experiments were contemplated.

External to the gasworks, there was the whole field of utilisation of coke and gas. In the latter, Section VI, some projects were included which bore upon the very important subjects of gaseous combustion and heat transfer. During 1948 the Board began an expansion of its work upon these subjects, in a number of different directions. The extensions had been consolidated during the past year in the 14 active projects. These were being conducted in the headquarters laboratories and partly in the University of Leeds under the Joint Research Committee. Collaboration was close, not only between the two sections, but with other combustion research laboratories in this country.

One section of their work, the study of the physics of heat transfer at low temperatures, has been suspended. In another, active work on the finding of an alternative to the leather meter diaphragm, might have to remain in abeyance.

With the completion of a large part of the headquarters premises, very satisfactory conditions for laboratory research had been established there, and facilities now existed for quite considerable expansion of the volume of work.

Mr. **A. Whitaker,** in expressing appreciation of the outline given by the Director, said that in the first section of his report Dr. King mentioned that the purpose of an annual report 'is to present short accounts of the progress made, during the calendar year, upon research projects.' He felt that the report did a lot more than that. It presented a clear picture of the whole range of work in the laboratories under the Director's control, a range of work which was most impressive. Their investigations should have this in common with the population—there should be some new ones being born every year, some should be approaching middle-age, and there should be some, and here there was a difference compared with the population, which were welcomed as coming to an end.

The work of the Board had been scattered in the past, adding to the load on the Director and his staff. It was very remarkable that after such a comparatively short time of occupation at Beckenham there should be reflected what he felt were the signs of a much greater integration in the research programme than they had perhaps experienced hitherto. Dr. King had not mentioned the extent to which the load on him and on all the staff must have been increased by the move. Some of the members might have experienced the difficulties and the amount of trouble involved when a research organisation had to be removed. It was indeed most satisfactory that in so short a time the work had developed so rapidly and so smoothly. He wished to express his deep appreciation of the work carried out during the year by the Director and all the staff under his control.

Mr. **J. T. Haynes** seconded the vote of thanks to Dr. King. He said that he had wished to say that in Dr. King they had a man of sterling worth, but he was not sure in these days whether that was a compliment or not! He did wish to compliment the Director, who had proved himself a first-class administrator. On the coal development side, in which he (Mr. Haynes) happened to be most interested, they should not forget the contribution made by the Bournemouth undertaking and by three outstanding contractors, who had given their services and erected plant at Bournemouth.

In seconding he knew that members of the Board would like to know what the future was to be. He happened to know nothing at all, but he did feel that with an organisation such as that which had been built up under Dr. King, the gas industry must and would continue to use its excellent services. He would like to mention in particular the spirit shown by the staff; their enthusiasm and powers of improvisation were something to be admired. Such a spirit had to be directed from the top, and Dr. King deserved all possible appreciation.

Dr. **J. G. King,** in reply, expressed his appreciation of the tributes paid which, he said, when passed on to his staff, would be appreciated even more.

The Question of Opportunity

Responding to the toast of 'the Chairman and Members of the North Western Gas Board' at the annual dinner of the Manchester District Junior Association of Gas Engineers, Mr. **E. A. Carpenter,** O.B.E., J.P., member of the board, said there appeared, unfortunately, to be a feeling in the gas industry that there was not going to be a greater opportunity for the advancement of its personnel in the future than there had been in the past. He wished to state definitely, and he was sure Colonel Carr would wish him to do so, that so far as the policy of the North Western Gas Board was concerned there would be full opportunity afforded for whatever talent there was within its ranks to come to the top. In making the appointments which had been made so far, it had been made clear they would be given to all those within the area who possessed the necessary qualifications to fulfil the duties connected with them. The applicants were considered on their individual merits. The board was determined that everyone should have a fair crack of the whip.

If there was any feeling in the area, particularly among the juniors, that there was not going to be similar opportunities for advancement to what had obtained in the past, he hoped he had said something to dispel the idea, because nothing could be worse for the industry that that sort of feeling should prevail. He could assure them, and he knew the Chairman and every member of the board would wish him to say, that it would be their policy to give the fullest opportunity for advancement to all the talent there was in the industry, and particularly to the North Western area.

No one area would approach the talent of another without the consent of the area concerned. This, however, raised a thought in his mind as to whether they were not going too far in that way. He could only speak for the North Western Board. Where there was an appointment to be made it was going to be notified to all within the area. They would look at the talent there was in the area, and as long as they had the talent to fill the post in the area they would use it. The time might well be when they should throw everything open to a wider field, but he could not say definitely whether that would be the case. But he could say that nothing was to be done at the time to limit the scope for advancement and for promotion.

Team Spirit

Speaking at a dinner-dance and whist drive held by the board's staff in the Bradford district, on April 18, Dr. R. S. Edwards, Chairman of the North Eastern Gas Board, stressed the importance of team spirit between executives and workpeople, particularly in nationalised industries. Some 79 former separate gas undertakings, he said, were now merged into one covering 4,000 square miles. He felt they had made better progress than any other board in the country. The aim and purpose of the board was to get around and make contact with as many of the staff as possible. Many former members of the staff of the Bradford gas undertaking, including Mr. G. E. Currier, former Chief Engineer at Bradford, Mr. H. Johnston, Mr. R. Anderson, and Mr. D. Hargreaves, were now in the board's service. Mr. C. A. Newham, group General Manager, who presided, welcomed the guests.

Brains Trust on Coke Sales Problems

THE meeting of the London and Counties Coke Sales Circle on March 22, at Gas Industry House, took the form of a Brains Trust. A number of questions were submitted in writing. They were categorised or grouped by the Question Master (Mr. F. S. Evans, Chairman of the Circle) and were dealt with by the members of the Brains Trust 'on the spot,' for they had no prior knowledge of the questions. Those members were Dr. F. J. Eaton, Mr. G. C. Champion, Mr. Jack Charrington, Mr. W. E. Daniel, and Mr. J. O. Cooke. Sir John Charrington (President of the Circle) was present, though not as a member of the Brains Trust.

The Questions

Can gasworks water gas plant be converted to operate on broken coke or breeze, to make available large coke for the consumer trade?

Dr. **Eaton** pointed out that normal water gas plant was designed to work on large coke, to secure large output. It could be adapted to use smaller sizes, down to boiler nut size, but output was decreased. Breeze could not be used; the resistance to the flow of gases through the producer was too great, and there was difficulty with clinkering.

Mr. **Evans** made the comment that the coke in a water gas plant was used completely, so that only ash remained. Many people seemed to think that coke which had been through a water gas plant was sold again!

What is the policy of the gas boards, following the de-restriction of coke, towards direct sales to domestic, industrial and Government consumers?

Mr. **Cooke** said the policy was to sell just as much coke as could be sold, of the right quality and type for its purpose.

Is coke worth the price and, if not, what steps are being taken under nationalisation to reduce it?

Mr. **Cooke** put the view that the quality of coke nowadays as compared with pre-war was no worse than in the case of anthracite, house coal or dry steam coal, and that in all-round competitiveness, gas coke was standing its ground pretty well.

The **Chairman** added that all the coke available was sold, and presumably, therefore, was worth its price.

Will summer prices be operative this year?

Mr. **Champion** commented that they would not be, if he had any say in the matter.

Dr. **Eaton** did not think it was proved that reduced prices in summer provided an incentive to buy; people would buy when they began to feel cold or if they felt there might be shortage. The charge for delivery was very high because transport must be available to deal with the rush in winter.

Mr. **Jack Charrington** referred to the 4s. per ton bonus paid by the Treasury on coke stocked at merchants' yards. They had to keep stocks in order to give immediate deliveries, because the gas undertakings could not load coke at the rate the merchants would like; and the holding of stocks cost money.

Mr. **Cooke** believed the present high price of solid fuel discouraged wholesale summer buying by the smaller buyers at any rate.

In the course of further discussion the view was expressed that the price would have to be reduced substantially in summer—by something nearer 10s. than 1s. per ton—if consumers were to be persuaded to stock. It was also pointed out by Mr. Cooke that the matter was under consideration, so that the question was rather premature.

A question concerned delays in loading, due to breakdowns, at provincial gasworks; it was asked whether they could be minimised by such means as notification of daily planned tonnages to merchants at fixed times.

It was stated that such means could be and had been adopted; and Dr. **Eaton** suggested that the general line to follow, in order to cope with such situations, was to install good mechanical handling plant, in which very big improvements had been effected.

Another question was whether the retail section of the Circle were in favour or otherwise of consumers being registered with coke producers or merchants, with the option of changing yearly.

The view of Mr. **Charrington,** supported by Mr. **Daniel,** was that, the coke market being free, people should be able to buy it where they liked.

Is the standardisation of sizes practicable and desirable?

Dr. **Eaton** said it was practicable; and unless sizes were standardised, we could not standardise plants as we desired.

Another question was, where wire mesh in vibratory screens required frequent replacement due to wear, whether good grading could be accomplished by punched-plate square-hole screens.

Dr. **Eaton** said equally good screening could be obtained with perforated plate or wire mesh.

Coke Quality

There are two general methods of improving the quality of coke for domestic fires, one by the use of specially selected coals and lower carbonising temperature, and the other by treating coke as ordinarily produced with alkali or with tar filming. Which method holds the most promise of success?

Dr. **Eaton** did not favour the use of tar oil, because the coke did not then burn smokelessly. Alkali activation for producer gas plants in vehicles was very good, because we were concerned to produce a very high calorific value gas, and the alkali, acting as a catalyst, helped the water-gas reaction. But in his view it was not suitable to alkali-activate the coke used in domestic appliances; in the open grate it gave a beautiful fire more quickly in the early stages, but later the fire looked dirty. For coke used in closed appliances, alkali activation was not necessary.

We could obtain a reactive coke by selection of the coal, but we had to take the coals that were supplied and to make from them a coke consistent in quality.

In reply to a further question on the same subject, he said tar filming had not been done commercially in this country; but in the United States oil filming had been used primarily as a means of dedusting.

Another questioner asked how a balance was struck between making a highly volatile coke for domestic purposes and a coke for industrial use, which did not need a high volatile. Was it the answer to have works which specialised in making only domestic coke?

Dr. **Eaton** said that to produce a uniform coke we could not go very much above 2-3% of volatile matter, and a coke of that type was equally suitable for domestic and industrial purposes; he would hate to put on any gas engineer the task of turning out a special coke for one purpose.

Mr. **Charrington** pointed out that the coke ovens produced a coke for industrial use primarily, and the merchants in London were selling the nuts, which made very good domestic coke.

Problems of Price

Is the Brains Trust aware that the large consumers of coke are tending to burn coal, for economic reasons, and how can the Gas Council assist coke contractors in their fight to retain this type of business?

Mr. **Daniel** said the problem was very serious in industrial and commercial practice. Surely the answer was to try to fire coke more efficiently, and at the same time to persuade the Gas Council to reduce the price of coke to such a level as to be able to offer the users an equivalent number of B.Th.U. per penny as in coal.

Mr. **Cooke** said the Coke Technical Committee of the Gas Council were working on the development of special coke-burning boilers and coke-handling stokers; a difficulty in regard to stokers for existing boilers was that at the same time we developed something which was equally suitable for handling coal in the form of singles and untreated smalls. He believed that in the next year or so they would be able to produce from breeze a sizeable quantity of coke beans which could be marketed at a price competitive with that of untreated smalls.

Mr. **Champion** said that all the remedies he had heard about were to produce appliances which would burn small coke, and it seemed that within a few years it would be difficult to sell large coke.

Mr. **Evans** commented that the gas industry was aware that, by reason of wartime increases, the price of coke was out of step and, he believed, it would seek to remedy that as it became more and more necessary.

A question from the hall pointed out that appliances admirable in themselves were badly fitted in many municipal dwellings, and the fuel was blamed for the inefficiency that resulted. Was anything effective being done to ensure that the appliances were properly fitted?

Dr. **Eaton** said that in some larger boroughs great attention was paid to proper fitting, but that was not universal. The makers issued excellent instructions.

But, considering that the gas undertakings were not installing the fitting, we were getting very much better installations today than ever; most troubles were with the older jobs, particularly conversions.

Mr. **Cooke** urged that it was a very real part of consumer service to ensure that coke customers were using properly installed appliances.

Sir **John Charrington** felt that too many fires for burning coke were being deflected to the use of coal, and urged that, particularly in large blocks of dwellings where coke-burning appliances were used, the coke merchant who failed to do everything possible to ensure that the tenants were using coke contentedly was making a mistake.

Mr. **Evans** said he knew one gas board in whose area the coke-burning appliances installed over two or three years would have consumed 100,000 tons more coke if they were honestly burning coke; but sales had increased by only 10,000 tons, the inference being that 90,000 tons of the wrong fuel were being used on those grates.

In the course of further discussion, a speaker said that in his experience 90% of the complaints received against any fuel, whether it be coke, coal or anthracite, were due to faulty appliances and not to the fuel; and Mr. **Daniel** mentioned American figures showing that, of all the complaints which fuel distributors received from consumers, only 1.5% were due to poor fuel. He emphasised that every sizeable distributor in this country had a department dealing with complaints.

Is it possible to formulate a price list giving a price for large coke and standard differentials for sized coke?

Mr. **Cooke** said there was a London and Counties coke marketing scheme which was still being operated by the nationalised industry.

Shaker Grids

Is there any reason, apart from increased cost, why a shaker grid or other form of integral ash remover is not applied to the Fulham grate?

Dr. **Eaton** said that suitable shaker grids would be of great advantage on open fires, but considerations of cost prevented their adoption.

Mr. **Charrington** suggested that 1s. 6d. on the standard price would probably solve the problem.

Why does it appear that there is less shale in coke produced from continuous vertical retorts than from either horizontal or intermittent vertical retorts?

Dr. **Eaton** said that generally Yorkshire coals were used in continuous verticals, certainly in the Midlands, and the shale content of some of the Yorkshire coals, he believed, was generally higher than in the Durham coals, as shown by recent tests. But possibly if another Durham coal and another Yorkshire coal were tested, the position would be reversed. It really depended on the preparation of the coal at the pit.

Another factor was the difference in density of shale and coke; the specific gravity of true shale was about 1.6, whereas that of coke was about 0.9. Thus, the shale gravitated to the bottom of a hopper, and one sample would probably have a higher shale content than another; so that the testing of only one sample might mislead.

A question, summed up by the Question Master, was whether it was reasonable, from the producers' point of view, for coke merchants to draw what coke they wanted when they wanted it.

Mr. **Charrington** said that in London the merchants had been fortunate in getting more of less what they wanted when they wanted it.

Mr. **Champion** suggested the questioner was crying for the moon. Whereas formerly the producers could employ 10 extra men temporarily when necessary, nowadays they used mechanical loaders, which would handle 100 tons a day. No-one would install another loader, at a cost of about £5,000, to deal with an extra 10 tons on two or three days.

Mr. **Charrington** commented that whereas, when coke was short, consumers had bought it when the merchants wanted them to, now that it was de-restricted the consumers would feel there was plenty. Thus the position would be vastly altered, and the question became very pertinent.

Coke Stocks

Mr. **Cooke** was anxious to correct the prevalent impression that there was plenty of coke. In fact, there was not, and the industry was selling every ton it produced. He added that, if a merchant were taking his share of responsibility by keeping stocks, it was reasonable that he should have the right to the sizes and types of coke he wanted, when he wanted them.

Mr. **Evans** said that whatever could be done to meet the wishes of the merchants would be done.

A questioner referred to the Coal Utilisation Joint Council's demonstration and training centre in London, dealing with domestic solid fuel burning appliances, and asked if a showroom and demonstration centre covering approved domestic coke-burning appliances would be valuable to architects, housing authorities and the like.

Mr. **Champion** recalled that such a centre was suggested five or six years ago and many had favoured it, but nobody had put up the money.

Sir **John Charrington** agreed that there was a good deal of enthusiasm for the idea, and he believed the money would have been forthcoming if suitable premises could have been obtained at a reasonable rent. He and Mr. Evans had examined various sites.

The C.U.J.C. centre at Vauxhall was a training centre, and was in rather a remote spot for the public; he believed Watson House did for coke what the C.U.J.C. centre did for coal. However, he would still like to see a demonstration centre in a convenient site.

Mr. **Evans** added that he did not think a building licence could have been obtained when the proposal was made formerly.

Is there a tendency to devote too much time and research to utilisation, namely, in improving appliances, and insufficient time and research to improvement in the product by way of screening, cleaning, consistent grading, &c.?

Dr. **Eaton** said there had been a great deal of research on mechanical handling, screening and moisture control, and probably today we could produce screening plant to give at least 90% within the size range required. A booklet was produced recently dealing with coke preparation—quenching, ash control, shale removal, &c.—for circulation to all area boards.

Effects of War Damage

Mr. **Charrington** felt that the shortcomings in respect of coke quality were due largely to war damage to works; and Mr. **Daniel,** who pointed out that a great deal of work had been done since the war to improve quality, suggested that the real difficulty was that the gas undertakings could not get the coal they wanted, from which to produce the right coke.

Mr. **Champion** made the point that the number of complaints received nowadays were less per 100 tons than before the war. The nature of complaints had also altered, and they were now concerned with large breeze contents or moisture contents, and so on.

Mr. **Evans** defended the works engineers and said that a large percentage of breeze was probably due to an accumulation of breeze in a hopper.

A questioner asked if the Brains Trust considered that dwellings in the future should incorporate bunkers, with automatic feeds to the appliances, in order to reduce the work of housewives.

Dr. **Eaton** felt that, if the architect considered that such things were worth while, he would incorporate them, without encouragement from the gas industry. On the other hand, such provision would impose limitations on design. It would be necessary also to provide means of loading bunkers from high level; and if one wanted to use a bunker for another appliance, its conversion would be expensive. The important thing was to make appliances efficient; generally the householder was content if appliances needed attention only twice a day.

Sir **John Charrington** said he was extremely anxious, now that the gas industry was nationalised, that producers and distributors should work better together than ever; the merchants were anxious to justify the confidence shown in them, and he suggested it would be useful if, at a future meeting of the Circle, there could be some straight talking by the producers, indicating what they wanted the distributors to do.

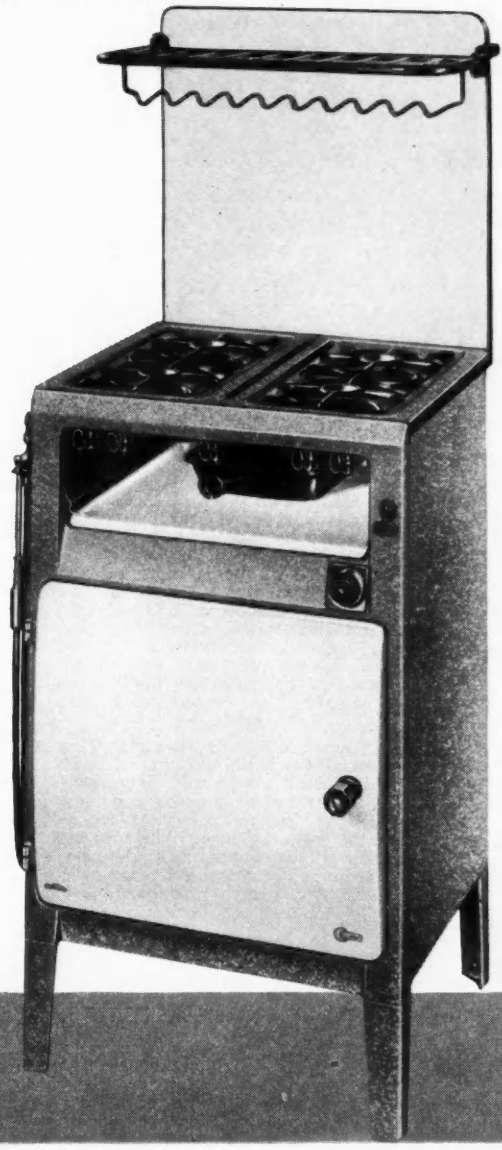
Canteen Equipment

Matrons from a number of convalescent and nursing homes in Sussex visited the South Eastern Gas Board's showrooms at Church Street, Brighton, to see a film show and hear a talk on the care of canteen equipment, and also to see a small exhibition of large scale cooking equipment. They were welcomed by Mr. H. B. Collins, Sales and Consumer Service Manager, Brighton undertaking.

The visit was sponsored by the King Edward Fund for London, which devotes much attention to the educational and financial needs of convalescent homes and similar institutions.

Miss M. G. Lloyd, senior Home Service Adviser of the Brighton undertaking, gave the talk, and the films, 'Canteen' and 'Catering' were shown by the undertaking's film unit.

"... It's a NEW WORLD for me"



Showrooms & London Offices: 7 & 8 Stratford Place, W.1.

NEW WORLD NEW WORLD NEW WORLD

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South Eastern Hire Problems

A MEETING of the South Eastern Gas Consultative Council was held on April 4, at 4-6, Wandsworth Road, London, S.W.8, the Chairman, Alderman A. C. Warwick, presiding.

The **Chairman** reported that the Kent Suburban district committee of the council had proposed that the period of office of members of the district committee should terminate on May 31, 1951, and that this should apply to all district committees of the council. This procedure, the Chairman added, would overcome the problem of new nominations if local councillors on the committees failed to gain re-election in the May local elections. The proposal was adopted by the council.

The council then approved two draft notices publicising the appointment and activities of the council, one for inclusion as a news item in local papers, the other for display in local offices and showrooms of the board, town halls, and post offices. In each case the text included the information that the consumer should only approach the council 'when satisfaction has not been obtained at their local showroom or office.'

The Chairman informed the council that two letters had been received for their attention. The first, from Mr. W. A. Steward, M.P. for Woolwich, West, asked why it was not possible for one of his constituents in Eltham to hire a gas wash boiler since he understood that such an arrangement could be made in the area of the North Thames Gas Board. The matter had been referred to the South Eastern Gas Board, and a letter had been sent to Mr. Steward informing him that Parliament had conferred autonomous powers on each board and that only hire purchase terms were available in the south eastern area.

Cooker Purchase

The second letter had been sent in the first place to the Minister of Fuel and Power by Mr. J. A. Boyd-Carpenter, M.P. for Kingston-on-Thames. This concerned a gas cooker which an old-age pensioner had taken on hire from the former Wandsworth and District Gas Company in 1936. In 1944 she had been informed by the company that she could buy the cooker for a sum of £1 15s., but had been unable to find the money at that time. Since then she had continued to pay for its hire, but when she recently approached the board she found that she would have to pay an unspecified but considerably increased sum to buy the cooker. The Chairman of the board, Mr. Hutchison, had informed Mr. Boyd-Carpenter that the board were fully aware that protracted terms of hire were often the cause of dissatisfaction. Continuing and increasing costs of maintaining and re-enamelling this type of cooker, of which there were 56,000 still on hire in the board's area, necessitated a purchase price more nearly related to present-day costs. While it was appreciated that the constituent was an old-age pensioner, it was not possible to take exceptional action in her case.

Alderman Warwick proposed that a letter from the council should be sent to Mr. Boyd-Carpenter pointing out that two offers to enable consumers to purchase this type of cooker had been made by the former company in 1944 and 1946, the 1946 price being higher than that offered in 1944. No mention would appear to have been made by the consumer of the 1946 offer. As both offers were subsequently withdrawn there was no alternative other than either to continue to hire the cooker or to pay a price higher and certainly not less than that offered in 1946.

Policy of Price

In discussion, a member of the council, Councillor **T. Dodman,** suggested that as the board had to bear increased costs of maintaining these cookers it would be more profitable if the board offered a lower and not a higher price for them. The Chairman replied that this had not as yet been considered as a policy by the board. The council agreed that a letter in the above terms should be sent to Mr. Boyd-Carpenter.

In conclusion, the Chairman announced that the calorific value of gas in the New Romney area would be raised to 500.

Progress at Perth

One of the many problems confronting the Scottish Gas Board at the time of nationalisation of the industry was the question of improving the supply of gas in the Blairgowrie and Coupar Angus district of Perthshire. Manufacturing capacity at Blairgowrie had already become overtaxed, and an expenditure of over £20,000 would have been required to provide additional plant for existing needs.

At Coupar Angus the gas undertaking was found to be in an unsatisfactory condition, both structurally and financially, and many thousands of pounds would have been necessary to reconstruct the gasworks there. With present-day delivery conditions, it would have been years before consumers could have benefited by any such progress.

As a result the board found themselves obliged to adopt the more speedy and economic long-term policy of laying a bulk supply pipeline from Perth, which, in addition to providing an adequate supply to Blairgowrie and Coupar Angus, will also enable dwellers in local villages as well as isolated farms and cottages en route to have a supply of gas for the first time. Life and capacity of the supply main will, of course, exceed the potential demands of the district by many times and consequently the same pipes will be available for extension to other areas whenever the necessity arises.

By a coincidence the scheme embarked upon by the Gas Board is in accordance with the recommendations of Mr. Gordon Payne, consulting architect, who produced a planning report for the East Central Scotland area, wherein he envisaged the linking-up of gas undertakings within the Strathmore Valley as a means of bringing to rural districts the amenities of a gas supply.

Work on the last stages of the pipeline is now in hand, and it is anticipated that within the next few weeks gas will be available to all districts in the area of Blairgowrie and Coupar Angus.

South Western Integration

The first meeting of the Taunton Local Committee attached to the South Western Gas Consultative Council on April 12 was presided over by Councillor A. W. Loveys, J.P.

In reply to a question about the pressure of gas in the South Petherton district, Mr. **L. P. Ingram,** Deputy General Manager, said it was hoped that there would be a marked improvement before the end of the year, as work will be in progress shortly to allow for Montacute to be supplied with gas from Yeovil. This would relieve the present demands on the Martock undertaking which was now supplying Montacute and thereby improve the supply of gas available to South Petherton. The pipe laying which would make this possible was part of a general integration scheme that might take 15 years to complete. Any distribution work that was done now was planned as an essential part of that scheme. Progress was limited both by financial considerations and the acute shortage of materials, particularly mains pipes.

Consideration was being given to the closing of the Wellington works as a manufacturing centre, but it would in any event continue to be used for distribution purposes. The gas would be produced by the Taunton works, which was capable of economic expansion. This was not practicable, however, for about two years.

It was announced that the board's policy was to replace the simple hire system for gas appliances by a more extensive range of hire purchase facilities.

Coal Output.—The Easter holidays resulted in the production of only 3,135,400 tons of coal during the week ended April 15, against 3,965,500 tons in the previous week. Manpower declined by 300 to 702,400 during the week ended April 8, all workers at the face. Gas available at gasworks in the week ended April 7 totalled 10,399.3 mill. cu.ft., against 10,862.4 mill. cu.ft. in the week before; electricity sent out for public supply amounted to 859.5 mill. units, against 942.4 mill., over the same period.

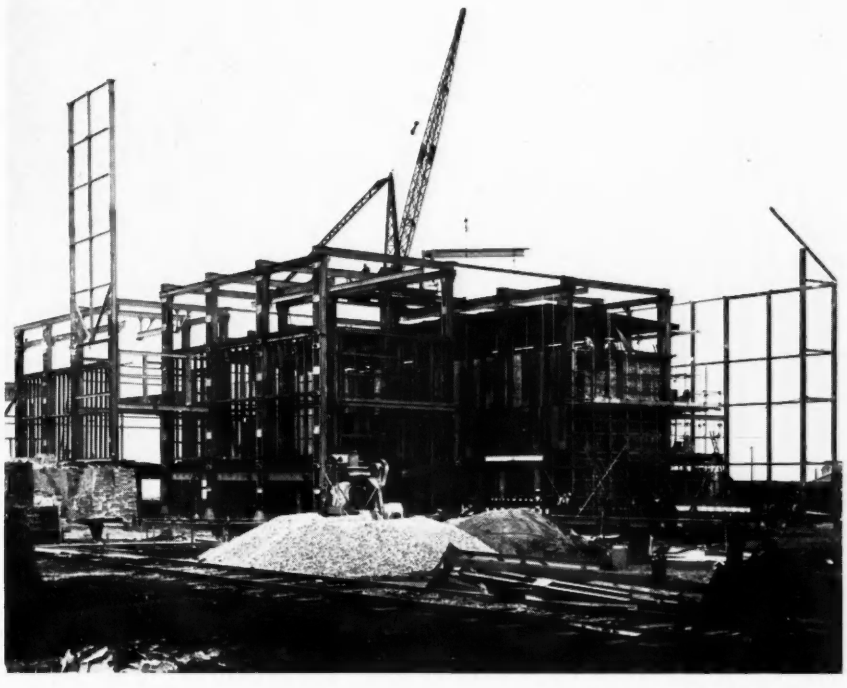
Gas Pipes Supply, Bristol.—Mr. S. S. Awbery, M.P. for Bristol, Central, asked the Minister of Health in the Commons on March 30 whether he was aware that the building of houses at one of the sites in Bristol might be retarded because of the delay in the supply of gas pipes, and what action he proposed to take to ensure an early delivery of those goods. Mr. Bevan replied that his officers were in touch with the South Western Gas Board.

Progress at Tingley

In the belief that gas engineers will be interested in the progress of the new works at Tingley arrangements have been made, through the courtesy of the North Eastern Gas Board, for our staff photographer to visit the site at intervals so that we can present a pictorial record. Our previous article, on February 22, showed views of the original site. On this page and the two following we indicate progress made to date.

IN the *Journal* of February 22 we published an article on the Tingley scheme of the North Eastern Gas Board. The article, by the Editor, was the result of an inspection of the site of the new Tingley gasworks. We expressed the view that these works are of first-class interest from the engineering, the chemical engineering, and the chemical points of view, apart from their primary importance in the integration schemes in the area of the North Eastern Gas Board. Work on the erection of this new works, which embodies unique features, is in full progress, and the whole plant is most impressive. Contracts for the new works were entered into prior to May last, the heart of the scheme being a carbonising plant of 72 Woodall-Duckham intermittent vertical chambers (capacity of each, 3¼ tons), recuperative type, in two self-contained units. Each unit comprises two benches in line, each bench comprising three settings of six chambers. Each setting is quite independent and could be heated up or let down without affecting the others. Three waste heat boilers (one standby) are each capable of producing 8,250 lb. per hour of steam at 150 lb. per sq. in. pressure. The installation is complete with coal and coke handling plant, coke screening and storage plant, and ash handling plant. Provision is made for an extension of the chamber plant by a further four similar benches, arranged in two lines parallel to the existing benches. Ultimate capacity of the plant will be 14 mill. cu.ft. per day.

In the North Eastern area Tingley will help partially to fulfil grid demand, and it is, of course, part only of the North Eastern Gas Board's plan to satisfy requirements.



Right: *The setting steelwork in course of construction for two benches with that of the other two completed, showing also the partly built chambers.*

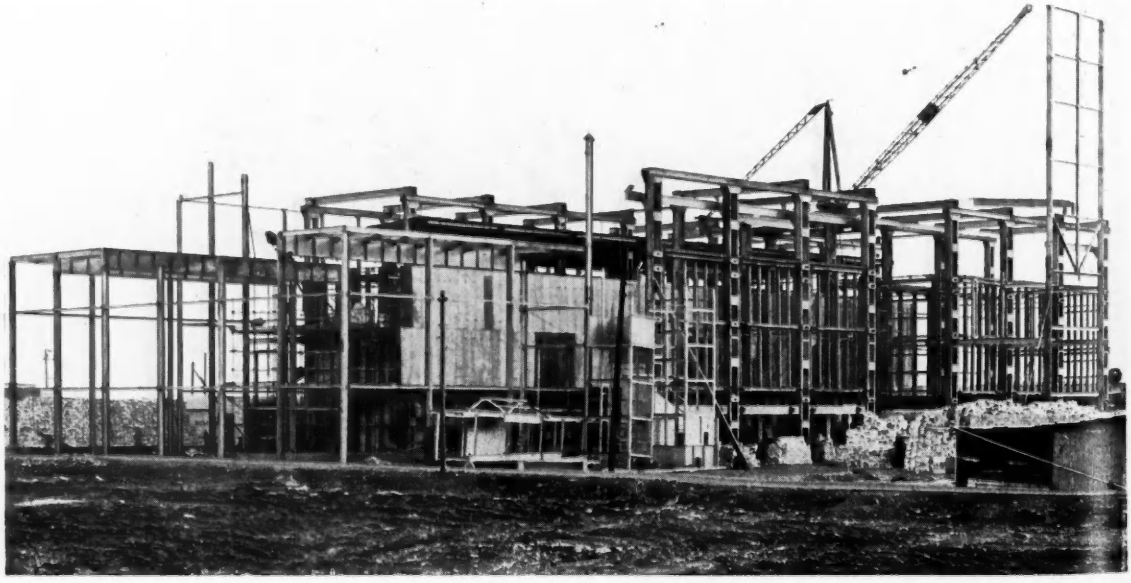
By courtesy of the W-D Company

Above: *This photograph shows the permanent sidings from the main railway line which will serve the carbonisation plant and the coke hoppers in the distance. The site is also on the main road connecting Leeds and Dewsbury, and the grid main of the former West Yorkshire Gas Distribution Company (U.K.) is alongside.*

Left: *An interior view of the reinforced concrete coke storage bunkers constructed by the Moorcroft Construction Co., Ltd., sub-contractors to the Woodall-Duckham Company.*

Below: *Another view of the setting steelwork for the four benches of 18 intermittent vertical chambers.*

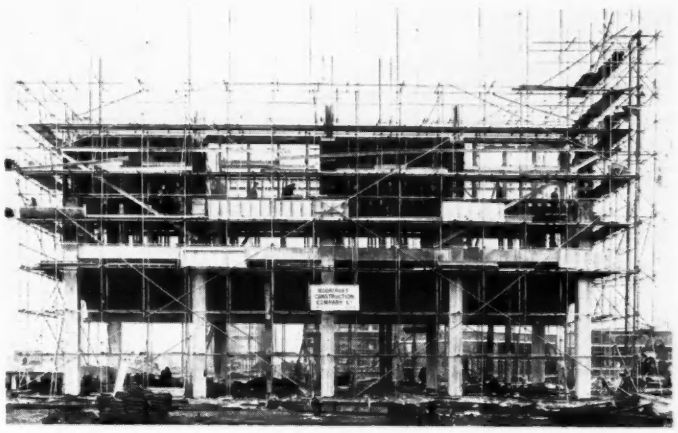
Photograph below by courtesy of the W-D Company



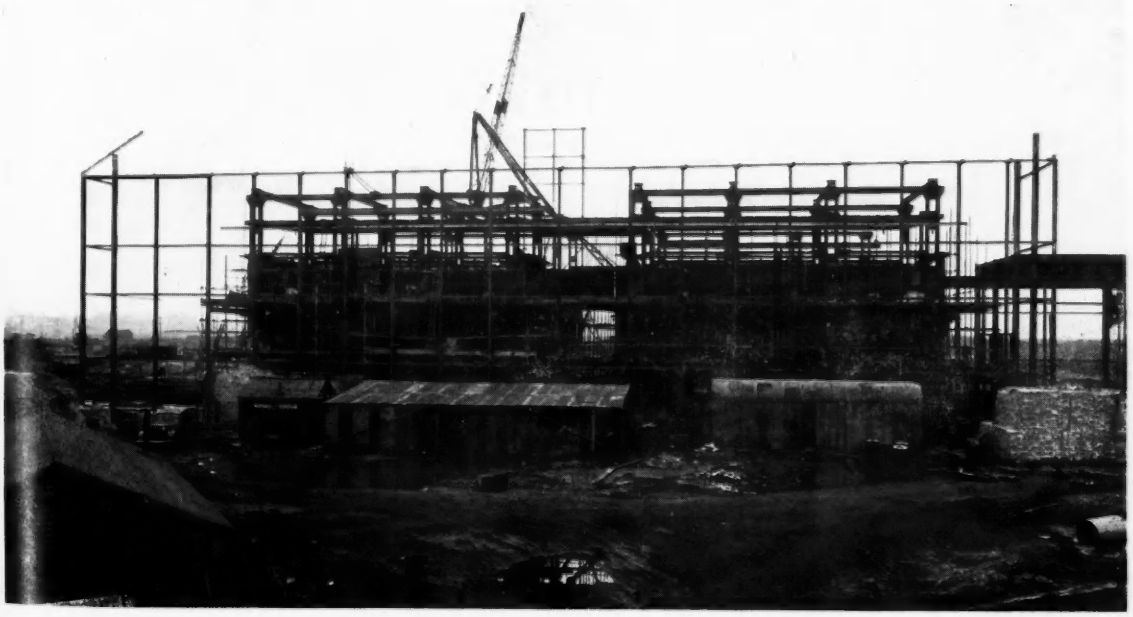
Above: *The excavation for the wagon tippler pit with the carbonisation plant structure and the coke storage bunkers behind.*

Right: *Exterior view of the coke storage bunkers.*

Below: *The partially completed benches. The boiler house steelwork can be seen on the extreme right. Results per day (using New Monckton washed doubles) will work out as follows: 475 tons coal carbonised; 7 mill. cu.ft. of gas with a c.v. of 505 B.Th.U. per cu.ft.; 5,225 gal. tar: 250 tons coke and breeze available for sale.*



The photographs of the coke storage bunkers are by courtesy of the Moorcroft Construction Co., Ltd.



A Novel Application for Gas

Wine, Beer, and Mineral Water Bottle Washer

THE heating of water and detergent solution for large scale bottle washing plant by means of gas was described by Mr. J. E. Cooper, Technical Manager of the Potterton Gas Division, Thomas De La Rue & Co., Ltd., at a meeting of the London and Southern Junior Gas Association.

In the past, said Mr. Cooper, heating had been commonly performed by steam, generated in solid fuel boilers. It was often necessary to keep the main boiler at work merely to provide steam for the bottle washing machines. Fuel costs thus tended to become high. Experiments had shown that heating could be carried out satisfactorily and at low cost by gas boilers. At the moment, Mr. Cooper continued, the company's experience lay mainly in the washing of beer, wine, and mineral water bottles, but it was likely that there would be developments in the washing of milk bottles.

The commonest design of washing machine was the conveyor or Hydro type. Washing and rinsing cycles were usually employed in the following order: (1) Warm water rinse. (2) Detergent wash. (3) Warm water rinse. (4) Cold water rinse.

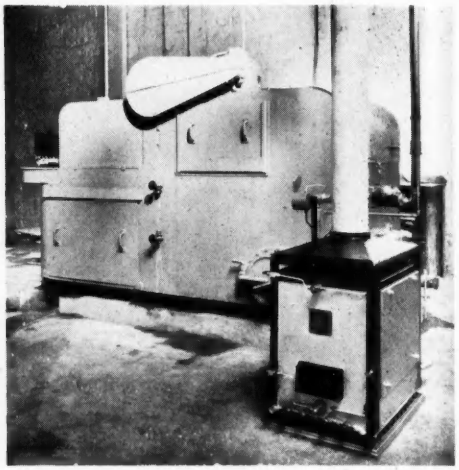
Detergent and warm water were stored in separate tanks within the base of the machine. Detergent was circulated through the thermostatically controlled boiler. The water was warmed by heating coils through which warmed detergent circulated naturally; thus one gas boiler performed the two operations.

The first rinse was introduced mainly to avoid thermal shock to the bottles as the detergent might be circulated at a temperature of up to 160° F. The rinses after the wash removed remaining traces of the detergent and of labels, and the warm rinse was again introduced to avoid shock cooling of the bottles.

Various detergents were used, the basis generally being sodium hydroxide, with possibly sodium silicate and sodium carbonate. In hard water areas small amounts of sodium hexa-meta-phosphate were introduced to prevent blockage of the sprays by scale. The hexa-meta-phosphate also alleviated scale deposition in the boiler itself.

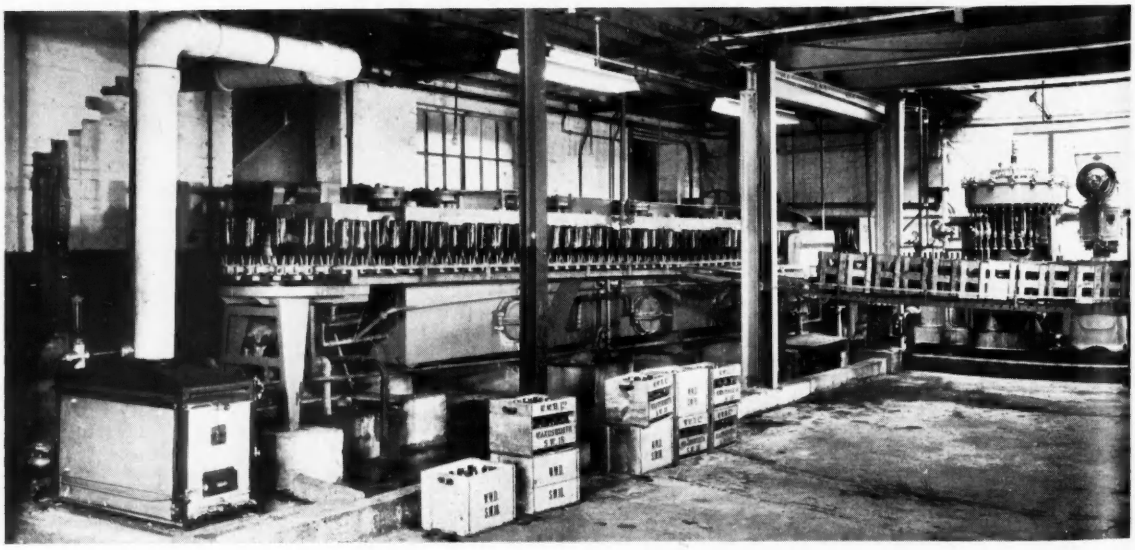
The boiler was fitted at floor level by the side of the machine. To obtain satisfactory circulation it was necessary in early installations, to fit the boilers in pits. This method was, of course, expensive. To heat the whole of the detergent, an injector system was introduced, the detergent pump accelerating circulation through the boiler. Initial heating of the detergent was controlled by timed thermo-syphon circulation. This was found necessary because the pump was not in action until the machine was working.

An expansion in the use of these machines was forecast by Mr. Cooper, in view of the increasing interest now being taken in the cleanliness of articles such as bottles and drinking utensils. As a rough guide to running cost, approximately 1,000 bottles can be washed for 1d. with gas at 1s. per therm.



Above is a view of the side of the washing machine, which is mounted on a plinth to help circulation during the initial heating of the detergent.

Below is a general view of the washing machine. This particular machine is served by two Rex D.6 boilers, only one of which is seen in the photograph.



A Visit to Claytons

Juniors Inspect Gasworks Plant Under Construction

ON Wednesday of last week over 150 members of the Yorkshire Junior Gas Association and the Manchester District Junior Association of Gas Engineers had the benefit of a whole-day tour of inspection of the extensive works at Hunslet of Clayton Son and Co., Ltd., where they were able to see gasworks plant and other heavy engineering work under construction by the firm. We had the pleasure of participating in this enlightening and educative tour, and certainly no pains were spared by the Directors of the firm to make the whole day both enjoyable and profitable. The Presidents of the two Associations, Mr. J. Hargreaves (Yorkshire) and Mr. R. J. Bradshaw (Manchester District), were accompanied by the Secretaries, Mr. G. E. Banks and Mr. T. W. Pickthall.

The firm of Clayton, Son and Co., Ltd., was established in Leeds in the year 1862 in modest premises as engineers and boilermakers. Most of the large old-established firms in all industries in this country have similarly sprung from small beginnings, increasing in size step by step as their reputation became established and their business consequently grew. Thus they built up at the same time sound experience, a reputation for good workmanship, and a wide circle of customers. The development of Claytons followed exactly these lines, emphasis always being placed upon achieving a reputation for high quality of product with the highest standards of business ethics.

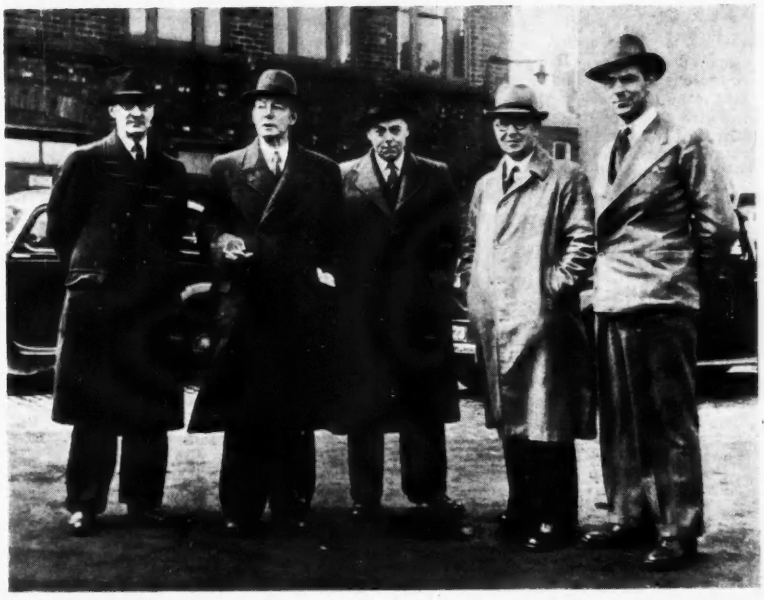
A Great Expansion

The intervening years since 1862 have seen the Clayton works expand till they now cover over 17 acres and comprise two major works in Leeds—Moor End and Pepper Road—and many subsidiary concerns. There is also the Dartmouth works consisting of pickling and painting shops. All three premises were visited, and the great variety of products manufactured was at once evident. The installation of modern machinery and methods has kept pace with engineering practice. Plant can be manufactured in riveted or welded construction; platework of any type or size can be made in any ferrous metal, including stainless steel and other ferrous alloys; large diameter water-gas welded, electric welded, and riveted pipes can be supplied, suitably lined if required for the conveyance of water, oil, or gas.

The name of Clayton has long been associated in the minds of gas engineers with the construction of gasholders although other plant used by gas undertakings is constructed in the Clayton works. The first holder to be erected by the firm was ordered in 1864, this being a single-lift holder, 30 ft. in diameter by 12 ft. deep, for the Spilsby Gas Company in Lincolnshire. This holder is still in use.

Since 1864 the firm has occupied a front place in the ranks of gasholder builders and has constructed holders for the principal gas undertakings at home and throughout the British Empire. Among notable column-guided holders erected by Claytons was the 12 mill. cu.ft. holder at East Greenwich for the South Metropolitan Gas Company, for many years the largest gasholder in the world.

The first successful spiral-guided holder was erected at Northwich in Cheshire by the firm, on Gadd & Mason's principle, in the year 1889, this holder having two lifts with a total capacity of 105,500 cu.ft. Both the column-guided holder and the spiral-guided holder are equipped with the new Clayton anti-freezing device.



Left to right: J. Hargreaves (President, Yorkshire Junior Gas Association), L. Hartley (Joint Managing Director, Clayton, Son and Co., Ltd.), F. Stansfield (Director), R. J. Bradshaw (President, Manchester District Junior Association of Gas Engineers), S. C. Thomson (Director).

The firm has built the M.A.N. type of waterless holder throughout the British Empire. The high-pressure holder made its appearance about 1930, and this type of holder has been manufactured by Claytons since it first came into prominence. Again, the earliest all-welded holders in this country were constructed by Claytons for Imperial Chemical Industries, Ltd., at Billingham, many years ago.

For three-quarters of a century the firm has made a speciality of gasholder repairs and has thus a great fund of experience in this difficult branch of holder work. The design and construction of a gasholder requires wide experience and a high degree of technical skill. The repair of bomb-damaged holders during the war of 1939-45 was a notable example of the application of this experience to unusual conditions. We mention, too, the Clayton patented method of renewing the crowns of gasholders while still at work, without welding. This has been successfully applied to a number of holders.

Most items of gasworks by-product plant are designed, constructed, and erected by the firm. These include condensers and heat exchangers, purifiers and oxide handling plant, mains, steam boilers, coal and coke handling plant, retort house steel girder roofs, steel bunkers, benzole plants, and storage tanks.

The construction of welded steel gas mains 15 in. diameter and over, is an important part of Clayton's work for the gas industry. The manufacture of these mains is concentrated at the Pepper Road works. These mains are welded with water-gas by the late Mr. Lawrence Clayton's roller system. In addition, mains for special purposes can be electrically welded or riveted.

In addition to manufacturing lap-welded pipes by the roller welding water-gas process, Claytons have from the earliest days of welding been practically interested in the development of welding steel pipes by the electric process, and a vast amount of welded pipes of this class has already passed through their shops. Pipes of riveted construction can also be supplied where purchasers prefer this type of manufacture.

On the occasion of this highly interest-

Snapped during the course of the visit of the Manchester District and Yorkshire Juniors to the works of Clayton, Son and Co., Ltd.

ing visit each of those taking part was presented with a profusely illustrated brochure showing the various types of plant manufactured by the firm. This brochure runs to 124 pages and is a record of which the firm may well be proud. It is a souvenir of achievement in an astonishingly wide field of heavy engineering. We cannot here enter into detail of the very many items dealt with in the brochure, but we may mention the Clayton cascade sytem of tar distillation—a plant characterised by continuous working, high efficiency, and simplicity. It is particularly suitable for installations treating up to 100 tons of tar per day, and installations of this system are at work in four continents. We would also mention as indicative of the firm's outlook the collaboration with Mr. H. J. Hodsman and Mr. A. A. Clark in the development of a new process, as a result of research carried out at Leeds University, concerning the interaction of tars and lime, by which products can be obtained with improved and peculiar properties.

Welcome and Thanks

During the interval between the morning and afternoon visits, the Directors of Clayton, Son & Co., Ltd., were hosts at luncheon given in the Queen's Hotel. This was a happy, informal affair and the speeches were accordingly tempered by the atmosphere of informality.

Mr. **L. Hartley** (Joint Managing Director) welcomed the two Junior Associations to Leeds and to the works of the firm. The Board had been happy to have the Yorkshire Association at their works in 1923; but there had been many changes since then, for, as they would have seen, the firm's major policy was to keep up to date in all respects. The visit that day had obviously been prompted by a desire to learn something, to acquire knowledge; and he hoped that no one would feel disappointment as a result of the tour of inspection. The firm had offered all a complete run of the works in a spirit of co-operation which they were anxious to encourage, irrespective of the change which had been made in the ownership and control of the gas industry.

Mr. **J. Hargreaves** welcomed the Manchester Juniors on this joint visit, which had for long been a useful and a happy feature of the Association's yearly activities. Those present had ample evidence of the reasons for the high reputation which the firm of Clayton enjoyed and the high regard in which their work was held not only in this country but throughout the world.

A vote of thanks to Clayton, Son and Co., Ltd., for their hospitality and for all the trouble they had taken in ensuring the success and enjoyment of the visit —an educative experience—was proposed by Mr. **R. J. Bradshaw,** and Mr. **B. F. Browne** (Regional Gas Officer, North Eastern Gas Board) seconded the vote, which was acclaimed by all with enthusiasm.

News in Brief

Sports Tour.—A successful Easter tour was made by the Hockey Section of the Gloucester Gas Sports and Social Club. Accompanied by wives and friends, the section played matches against Ringwood, Wimborne, and Weymouth. The Secretary of the section is anxious to contact other teams in the gas industry.

National Benzole Extensions.—The National Benzole Co., Ltd., have purchased a modern factory with some 3½ acres of ground near the Watford By-Pass. The new building will provide room for nearly three times the present Willesden staff, and will enable research work on behalf of the whole benzole industry to be intensified. The engine research section will be increased and more facilities for coping with quality control provided. A pilot plant laboratory is also contemplated.

Extensions at Spalding.—Extensions to the gasworks at Spalding, East Midlands, which when completed will result in a doubling of output, have now started with the demolition of an old gasholder and some cooling condensers which are over 60 years old. The first of the extensions will be a third retort house, which is to be started in the near future. At the side of this is to be built a coke handling, grading and storage plant, new carbonising plant and additional purification plant, with improved facilities for the staff and better amenities for customers paying their accounts and buying appliances.

Press Talk.—Mr. Reginald S. Hinder, Press Officer of the Gas Council, gave a talk on April 17 to the North London Gas Salesmen's Circle on 'The Press.' By courtesy of the Hon. Librarian of the Press Club original copies of the first British newspapers and other priceless documents were displayed.

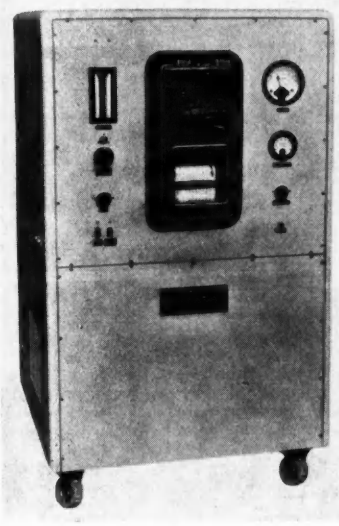
Institution of Mechanical Engineers.—The attention of members of the Institution of Gas Engineers is drawn to a meeting of The Institution of Mechanical Engineers, Storey's Gate, St. James's Park, S.W.1, on May 5, 5.30 p.m., at which a discussion on Education and Training in Engineering Management will be introduced by H. G. Nelson, M.A., A.M.I.MECH.E. Applications for attendance should be made through the Secretary of Institution of Gas Engineers, 17, Grosvenor Crescent, S.W.1.

Century of Service.—The severance of a gas main in Chapel Lane, Bingley, on April 15, resulted in the removal of a valve which originally controlled the first gas supply in the town. The mill of Mr. Alfred Sharp, which stood on land adjoining Chapel Lane, first supplied the service. The gas main is over 100 years old, and originally conveyed gas to Mr. Sharp's home at Myrtle Grove, now Bingley's town hall, and to other homes in the vicinity. When the manufacture of gas was taken over by a gas company it was supplied through the same main by linking up at the opposite end of the town.

Dew-point Recorder

Modern science has emphasised the need for means of determining the moisture in air and other gases and of continuous, precise measurement of very small amounts of such moisture. The most convenient method of determining moisture content, especially at low values, is that of cooling the air or gas to its dew-point, that is, the temperature at which it becomes saturated and dew deposition occurs. It will be appreciated that the more moisture the sample contains the less it needs to be cooled before dew is deposited. Conversely, if the sample contains but a small amount of moisture, it will need to be reduced to a very low temperature before dew is formed. There is, in fact, a definite relationship between the dew-point of a gas and its moisture content.

A new Elliott instrument utilises a novel method of dew-point measurement which enables it to operate automatically and continuously and to provide, if required, a continuous chart record of dew-point. A particular value of this hygrometer is that it will measure very dry air with 'dew-points' or frost-points much below 0°C. Unlike other hygrometers, it requires no replacement of water absorbing materials, or hygroscopic acids or salts. Moreover, as it is based on fundamentally correct principles, its accuracy at normal humidities is higher than can usually be obtained.



The new Elliott recorder.

Two new types are available, one for meteorological purposes and the other, which is of most interest to physicists and chemists, for industrial purposes, though both types are similar in principle. The industrial instrument has a range of dew-points from −40°C. to +20°C. with an accuracy of ½°C. and a time response of approximately 2 secs. It is suitable for use with air or non-corrosive gases at pressures of 20 in. water gauge above or below atmospheric and is designed for continuous operation.

The dew-point recorder has many applications in research, in the chemical industry, gas manufacture, and has been successfully used for measurement of dew-point of producer gas for heat treatment plant. It is a product of Elliott Brothers (London), Ltd., Century Works, Lewisham, S.E.13.

Coke Breeze Firing

We have received from Mr. C. F. Wade a description of the Wade furnace (Brit. Pats. 621,521 and 352,250) which, he explains, is eminently suitable for burning coke breeze, giving very high combustion and steaming rates.

The furnace is of the well-grate or retort type. A set of centre small firebars are supported by a main air trunk which also carries the lower ends of the main side bars. Air for combustion is delivered by forced draught fan into the main trunk, from which it is distributed transversely under control of sliding shutters. There is regulation of secondary air by longitudinal dampers. No special skill is required for firing, and cleaning is simple. The flexibility of air distribution and control renders the furnace capable of dealing with any variety of solid fuel.

The furnace is marketed by the Wade Furnace and Combustion Company, 29, Bodenham Road, Northfield, Birmingham, 31.

Family Spirit

The annual dinner and social evening of **A. G. Sutherland, Ltd.,** was held on March 24, and among those present were Messrs. A. G. B. Owen and C. E. Partridge, both directors of the Company, and Mr. B. E. Mace, the Company's Chairman. The Managing Director, Mr. W. D. Cheshire, officiated as chairman on this occasion, at which a contingent from the London works were present for the first time, headed by Mr. J. H. Henderson. Mr. Owen presented gold wristlet watches to 22 employees who had 25 years or more of continuous service with the Company. After the presentation Mr. Owen responded to the toast of 'The Firm,' proposed by Mr. Evanson, shop steward.

GAS UNDERTAKINGS' RESULTS

Montevideo Gas and Dry Dock Company

The Directors recommend the payment of a dividend of 5%, less tax, for the year ended December 31. No dividend was paid in respect of 1948, compared with 2% in 1947. Net profit, after providing for profits tax and other charges, amounts to £104,043, compared with £40,550 in the previous year. An exchange profit of £82,917 is included in the profit for 1949, against an exchange loss of £27,249 for 1948.

Londonderry Gaslight Company

Final dividends have been paid for the year ended December 31, 1949, of 5% on the Old shares and 3½% on the New, all less tax. The balance carried forward to the profit and loss account is £9,710, as against £3,325 for 1948.

In his report the Chairman, Capt. B. F. McCorkell, says that the output of gas last year was the highest in the history of the Company. The demand for gas for cooking has been amply demonstrated by the almost universal choice of gas by tenants in the city's new housing estates, and the use of gas by industry is also rapidly extending. The Corporation, says the Chairman, are contemplating the acquisition of the undertaking, but as yet no offer has been made.

Cork Gas Consumers' Company

At the annual general meeting the Chairman, Mr. E. T. Mahony, said that during 1949 there had been a satisfactory increase of 8% in the volume of gas delivered. Coal had been in adequate supply and was of better quality, but the cost was still very high. Considerable progress has been made in the housing schemes of the Cork Corporation and of private enterprise, and practically all the tenants of new houses installed gas for cooking and other domestic purposes. The high pressure system, now in operation for 18 months, provided a satisfactory supply to new estates and could meet all further developments. The service department had installed over 1,500 gas cookers and other apparatus during the year, and several modern central heating plants had been completed. The meeting passed a resolution converting the present £5 shares into £1 units of stock, and the Chairman indicated that the raising of additional capital was under consideration.

Australian Gas Light Company

The report of the Directors of the Australian Gas Light Company for the year ended December 31 records a loss of £2,492, compared with a profit of 1948 of £44,174. There is a balance to be carried forward of £35,087, against a sum of £37,850 brought in from the previous year. The Directors add that proprietors have been informed during the year of the continuing unsatisfactory position of the Company's trading operations and of persistent but unavailing efforts to obtain adequate relief. Notwithstanding formal applications for a board of inquiry, and personal representations to the Premier by the Directors at various times during the year, it was not until February 10 this year that a board of inquiry was officially appointed to inquire into the prices of gas properly to be charged by the Company. The activities of the Company, the report continues, are of such importance to the community that there should be prompt adjustments in price approved by the New South Wales Government, which alone has power to act in the matter, to compensate for changes in costs.

International Gas Union

Technical Questions for Member Organisations

BY invitation of the Association des Gaziers Belges, a Council meeting of the International Gas Union was held on February 20 and 21 at Brussels, under the chairmanship of M. M. Brabant, President.

The following member organisations were represented at the meeting:

Belgium: Mr. V. Timmermans, Past President of the Association des Gaziers Belges.

France: M. E. Biard, President of the Association Technique de l'Industrie du Gaz en France; M. P. Mougin, Hon. General Secretary of the International Gas Union; Directeur de l'Equipement of 'Gaz de France'; and M. A. Lihrmann, General Secretary of the Association Technique de l'Industrie du Gaz en France.

Great Britain: Mr. F. M. Birks, Vice-President of the Institution of Gas Engineers and Deputy Chairman, North Thames Gas Board; and Dr. W. T. K. Braunholtz, Hon. General Secretary of the International Gas Union and Secretary of the Institution.

Netherlands: Professor ir. G. A. Brender à Brandis, Vice-President of the International Gas Union; Mr. C. L. Philips, Past President of the Vereeniging van Gasfabrikanten in Nederland; and Mr. P. Hijdelaar, Secretary.

Switzerland: M. Trechsel, President of the Société Suisse de l'Industrie du Gaz et des Eaux; Dr. Hs. Deringer, Past President of the Société; and M. H. Zollikofer, Hon. General Secretary of the International Gas Union; and General Secretary of the Société Suisse de l'Industrie du Gaz et des Eaux.

The meetings were held at Hotel Ravenstein, the headquarters of the Société Royale Belge des Ingénieurs et Industriels.

M. M. Brabant, President of the Association des Gaziers Belges, give a cordial welcome to the members of the Council on behalf of the Association des Gaziers Belges.

The Council admitted the Norske Gassverkers Forening as a member of the International Gas Union.

The list of members of the International Gas Union was reported as follows:

American Gas Association.
Association des Gaziers Belges.
Association Technique de l'Industrie du Gaz en France.
Associazione Nazionale Industriali Gas.
Canadian Gas Association.
Dansk Gasteknisk Forening.
Institution of Gas Engineers.
Norske Gassverkers Forening.
Osterreichischer Verein von Gas-und Wasserfachmännern.
Plynarensky, Vodarensky a Zdravotne—Technicky Svaz Cs.
Société Suisse de l'Industrie du Gaz et des Eaux.
Svenska Gasverkersforeningen.
Vereeniging van Gasfabrikanten in Nederland.

M. P. Mougin, M. H. Zollikofer, and Dr. W. T. K. Braunholtz were appointed Hon. General Secretaries, in recognition of the services render by them to the International Gas Union.

The Council proceeded to the examination of the following technical questions which were proposed by the various national organisations:

American Gas Association:

More complete exchange of both technical and general industry information.

Association des Gaziers Belges:

Unification de la classification des feuilles bibliographiques.

Projet de bibliographie des ouvrages relatifs à l'industrie du gaz.

Projet d'exposition en 1952 de documents publicitaires publiés depuis 1945 et projection de films de propagande.

Utilisation du coke dans les foyers domestiques.

Normes à fixer pour le contrôle de la teneur limite en H_2S du gaz distribué.

Association Technique de l'Industrie du Gaz en France:

Problème de la substitution des différents gaz.

Utilisation des conduites pour le stockage du gaz.

Distribution du gaz par conduites aériennes.

Pose de canalisations de gaz en galeries.

Revêtement des canalisations d'acier.

Nouvelles applications du gas (rayonnement infra-rouge; cémentation gazeuse).

L'utilisation industrielle du coke.

Remise à jour du vocabulaire anglais-francais-allemand.

Formation professionnelle dans l'industrie gazière.

Canadian Gas Association:

A summary of the most important developments of each year.

Standardisation of the fundamental tests for the approval of gas appliances.

Dansk Gasteknisk Forening:

Standardisation of the fundamental test requirements for the performance of gas appliances and gas-heated ovens.

Institution of Gas Engineers:

Education and training of personnel of all grades (including the professional engineer) in the gas industry.

Methods of disposing of gasworks effluents, in particular ammoniacal effluents.

Osterreichischer Verein von Gas-und Wasserfachmännern:

Comment parer à la consommation de gaz aux heures de pointe durant les mois d'hiver.

Plynarensky, Vodarensky a Zdravotne-Techniky Svaz Cs:

The inner and outer corrosion of gas mains.

Purification of gas by means of active-carbon and refrigeration.

The use of gas in the glass and ceramic industry.

Svenska Gasverksföreningen:

How to support the gas industry in connection with the competition with electricity.

Vereeniging van Gasfabrikanten in Nederland:

La détermination des éléments de mesure des caractéristiques de combustion du gaz.

L'étude et la discussion du problème de la combustion sans buse d'évacuation des gaz brûlés pour le chauffage domestique.

La continuation des efforts pour uniformiser les conditions d'estampillage les plus fondamentales des appareils à gaz.

Unification des prescriptions de sécurité au sujet des gazomètres à volume constant (à haute pression).

The study of those questions was allocated between the different associations.

THE BURDEN OF TAXATION

Addressing the annual meeting on April 19 of the Federation of British Industries, of which he was elected President for a second year, Sir Robert Sinclair, K.C.B., K.B.E., said the past year had given striking evidence of the virility of productive industry. There had been an appreciable increase in total production. There had been evidence of a rising trend in productivity. There had been a considerable improvement in our position as regards dollar balances, though we still had a long way to go. There were, in short, good grounds for hope for the future. But unless there was a substantial reduction in Government expenditure soon (so as to make possible reductions not only in corporate taxation but in general taxation as well), we were not going to make the best of the recuperative power that was in us. Nothing that the Chancellor of the Exchequer had said on Budget day shook his view that this was true.

Past or present achievements, whether of increased total production or of higher productivity, did not vitiate this argument. The incidence of taxation on industrial companies had had the result not only of forcing them to live on capital, but also of preventing the adequate provision for future needs on which our future performance must depend. The increase in initial allowances for replaced capital would help; but this was at best an anticipation of allowances that we should in any event receive. It was no substitute for the reduction in Government expenditure, which alone could make possible some real alleviation of the situation.

A long-term programme for fuel appliances, heaters, and cookers for new and reconditioned Scottish houses has been announced by Sir Patrick Dollan, Chairman of the Scottish Fuel Efficiency Committee. The Ministry of Fuel and Power and the Department of Scientific and Industrial Research had now tested 74 'improved' or proved grates and appliances, he said. The use of these appliances would save coal. Scottish housewives alone used 80,000 tons a week; saving in domestic and commercial fuel consumption would make a larger quantity of fuel available for export.

THE USE OF STEAM EJECTORS AS AN AID TO DRY PURIFICATION*

By L. J. COLLINS, Assoc.M.Inst.Gas E.
(Luton District, Eastern Gas Board)

THE costs, both capital and operational, incurred by the removal of hydrogen sulphide from coal gas constitute the larger part of the total costs of the gas manufacturing process, charged between the retort house governor and the holder inlet. This being so, the importance of ensuring the best possible results from this section of the works is obvious, and the necessary technical supervision is thoroughly justified.

The chemical mechanism of the action which occurs in the purifier is the oxidation of hydrogen sulphide to water and free sulphur largely through the medium of ferric oxide, monohydrate, $Fe_2O_3\ H_2O$. This action can take place in two ways, which can proceed concurrently, first by a superficial reaction between hydrogen sulphide and oxygen and secondly in two stages, known as fouling or sulphiding and revivification or oxidation respectively. During fouling, the oxide is converted to ferric sulphide by the action of hydrogen sulphide. Then during revivification oxygen reacts with the sulphide to change it back to ferric oxide, with the deposition of free sulphur in the purifying material. This revivification can take place when the material is dug out of the purifiers and exposed to the atmosphere, or it can take place within the purifier itself by the action of oxygen present in the gas, the latter action is known as revivification in situ. In view of the high cost of handling oxide in and out of purifiers and in breaking it, the advantage of making the maximum use of revivification in situ is plain, and in addition the tendency for the oxide to fire on being removed from the purifier is greatly reduced.

From the chemical equation of the oxidation of hydrogen sulphide,

$$2\ H_2S + O_2 \rightarrow 2\ H_2O + 2S$$

it is seen that every volume of oxygen present in the gas could oxidise two volumes of hydrogen sulphide. As the amounts of oxygen and hydrogen sulphide present in crude coal gas are approximately in this proportion, it would appear that revivification in situ could proceed quite automatically and unassisted. In practice, however, it is necessary to have at least twice the theoretical quantity of oxygen in order that revivification can take place.

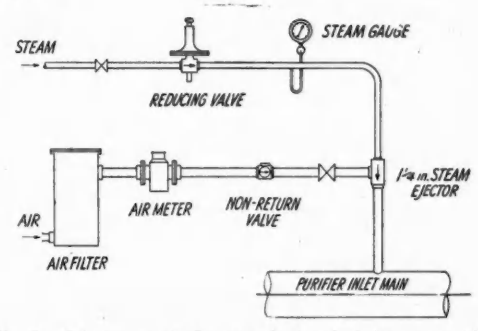


Fig. 1.—Diagrammatic layout of air admission to purifiers using steam ejector.

The question arises as to how this additional oxygen shall be provided. In all the methods in general use the oxygen is added in the form of air, and thus for every volume of oxygen, approximately four volumes of nitrogen, an inert constituent, are passed into the gas stream; sufficient reason for the air admission to be under close control. The means available for admitting this air to the gas stream are: (a) Drawing it into the stream at the exhauster inlet or at the primary condenser, by the simple method of removing a plug from the main; (b) supplying air under pressure at the purifier inlet by a small, independently driven compressor, or by a blower driven by the exhauster engine or from the shaft of a rotary washer; (c) supplied by means of a steam ejector.

The last method has certain advantages over the others, and the application of this principle has been used at Luton for some time and has proved very satisfactory. Although this method has not been widely used, a brief mention of it appears in some of the standard works and more recently Mr. Howes, in his Presidential Address to the Eastern Association of Gas Engineers and Managers in 1946, referred to the good results he had obtained by supplying 60% of the air required for revivification by means of steam injectors.

The arrangement used at Luton consists, as will be seen from Fig. 1, of an ordinary steam ejector supplied with steam through an adjustable reducing valve. The air is drawn through a rotary type meter which is protected by an air filter on the inlet side. A non-return valve is fitted in the air line to prevent gas blowing back, should the steam supply be inadvertently shut off.

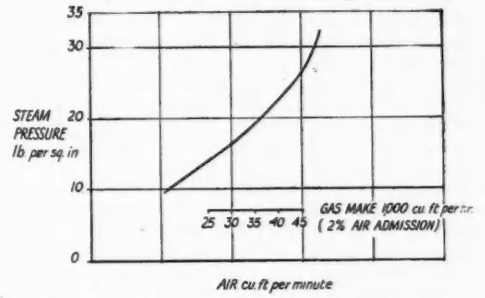


Fig. 2.—Steam pressure air injected diagram for a typical installation.

The advantages of this system can be discussed under the headings of capital cost, installation cost, adaptability, dual purpose, and ease of control.

Capital Cost

The capital cost is extremely low; that of the typical installation illustrated was approximately £60 at present-day prices, which included all necessary valves and fittings; £40 of this was incurred by the air meter and filter, and it is thought that in certain circumstances these items could be dispensed with and a simple U tube manometer fitted to give an indication of the air flow, thus reducing the total cost to about £20. The installation to which these costs refer is capable of providing 2% air admission to a 1 mill. cu.ft. per day gas stream.

The installation cost is also extremely low. The apparatus can be fitted at the outlet of the washer or at the purifier inlet, and normally steam is available at either of these points. The work can be carried out quite quickly by a pipe fitter using standard parts.

On account of the two previous factors it is practicable to provide an independent air supply to each of several separate gas streams. In fact, at Luton there are no less than four such streams, each fitted with its ejector. The amount of pipework that would be required to provide air from a central compressor under the same conditions would be large and costly.

This system apart from supplying air also provides two other essential constituents for the purification process, namely,

(*Continued in colum 2 of p. 260.*)

* Short paper presented to the London & Southern Junior Gas Association, March 10, 1950.

PRACTICAL ASPECTS OF DESIGN AND CONSTRUCTION IN GASWORKS INSTALLATIONS*

By S. C. HERBERT, B.Sc.(Eng.), A.M.I.Mech.E.,
Mechanical Superintendent, Kent Suburban Division, South Eastern Gas Board.

Continued from page 118

IN electric drives, electrical overload devices are fitted to protect the windings and insulation from excessive current flow, and if sudden stalling of the motor is possible they should not be relied upon to prevent mechanical damage to the motor or transmission.

Bearings and their lubrication form a fruitful field for experiment. Phosphor bronze and white metal remain in the first rank for all sizes of high-speed shafts, with pressure oil feeds to assist in starting and to remove heat. Ball and roller bearings are fitted in many small and medium drives, particularly in electric motors, and special felt and mechanical seals have been developed to exclude dirt. Generally, the greater flexibility of the ballrace, particularly in the self-aligning types, gives greater satisfaction than does the roller-bearing when mounted upon relatively flexible structural steelwork, and a change to ballraces can often result in longer life and cooler running.

Grease lubrication is extensively employed but requires care when applied to ball and roller bearings, since overfilling of such bearings will cause overheating and ultimate failure. There is a tendency in industry to adopt centralised batteries of oil or grease lubrication points with extensive runs of tubing to remote parts of the equipment. In the gas industry, such systems have been adopted to some extent, but bring disadvantages in their train. Not only do they encourage the greaser to neglect examination of his bearings, but piping which is out of sight cannot be examined for leaks. Where centralised greasing systems are employed, brass piping should always be used, and if piped oil and grease feeds are provided on the same plant a standardised and distinctive type of nipple should be adopted for each system to prevent mistakes. Correct quality of grease should be used, to avoid the generation of high pressures in efforts to force unduly stiff grease through long runs of tubing.

Frequently, conditions on site do not allow of repair of finely-finished equipment on the machine, and replacement of a complete unit is necessary. Success can be obtained, however, only if the designer arranges sufficient space for removal of bolts and for disengagement of coupling spigots. By such methods the delay to the process becomes shorter and the repair of the faulty part receives more adequate attention under repair-shop conditions.

Cast iron soleplates under heavy bearings should never be relied upon to carry upthrust loads, owing to the extensive coring provided in most cases to house the bearing boltheads.

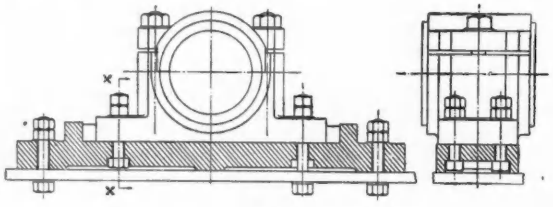


Fig. 8.

Fig. 8 illustrates a design commonly found in engineering practice, in which it may be seen that the distance between holding-down bolts is greatly increased and the section through XX is reduced considerably, with consequent reduction in strength. The bearing bolts themselves should pass through the soleplate into the main member for security, and such bolts should never be of the collared type, so that damaged bolts may be moved without re-lifting the shaft and bearing.

The fitting of a hand-ratcheting square on a convenient shaft permits the movement by hand of a machine which has been rendered immobile by power failure, and enables expensive parts to be retrieved from prolonged exposure to detrimental conditions in which the power failure has left them, or to restore to a safe position equipment which might receive damage or obstruct other operations if left until power is again available. Such hand winding gear should be regarded as indispensable on equipment such as horizontal retort house discharger rams of the drum-and-chain type, and for man-carrying lifts.

Electrical Requirements

The long periods of uninterrupted service required, and the severity of operating conditions, have promoted the design of special electrical equipment for gasworks service, capable of excluding from its working parts the harmful vapours and abrasive dust, and possessing many of the characteristics of flameproof construction. These designs are costly, and more bulky than standard industrial equipment, but the freedom from breakdown obtained from their adoption amply justifies their use to the exclusion of ventilated electrical equipment.

All equipment must be liberally rated and allowance made for the high ambient temperatures found on some gasworks plants, and enclosures should preferably be constructed in cast iron or in $\frac{1}{8}$ in. thick mild steel boiler plate, galvanised after made. Cable runs should be in armoured cable, with V.I.R.

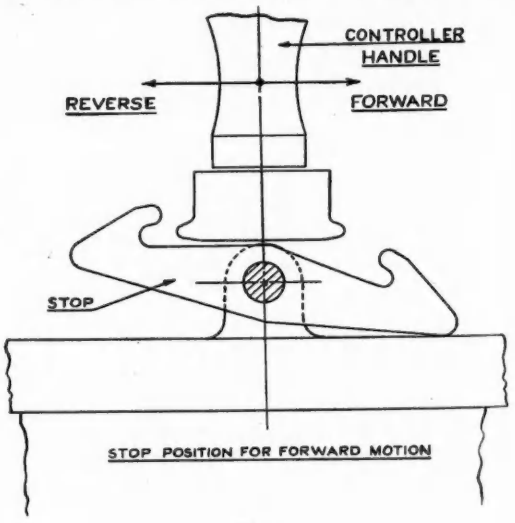


Fig. 9.

in conduit limited to very short circuits. Care must be taken to provide for adequate drainage of moisture from conduits, and knockouts in equipment cases must be sealed, conduit connections always being run solidly into the cases, with flexible armoured tubing if necessary.

Standardisation of equipment should be enforced, to reduce the stocks of spares, and should cover motors, starters, fuses and fuseboxes, and plugpoints particularly, special attention being paid to the use of three-pin plugs, properly earthed, for

* Paper presented to the Southern Association of Gas Engineers and Managers (Eastern District), March 28, 1950.

all portable tools, with rigid control of the electrical load drawn from the various sizes of plug in use.

Maintenance of equipment must be convenient and simple to carry out. Wearing parts of switchgear should be rapidly replaceable without the removal of connections and with a minimum of general dismantling to obtain access. Wiring terminals should preferably be on the front of the panel and clearly labelled, and not housed behind resistances and various other impedimenta fixed behind the board.

Abuse of electrical equipment in operation should be prevented by the use of free-handle circuit-breakers and the employment of guards on reversing controllers to prevent the sudden application of full reverse voltage on a rotating motor, unless the motor is specifically designed for reverse-current braking. Fig. 9 shows an example of such a guard, which requires the operator to pause for a second in the 'off' position while he presses the guard down, before he can reverse the motor. All power circuits should be fitted with ammeters, which give a ready check upon loading.

Stopbuttons must be fitted at strategic points for emergency use, and should be of standard design, easily recognisable, and clearly labelled. Manual-reset types, with means for padlocking when 'off,' used in conjunction with power-operated starting contactors supplied with power via the stop-button circuits, and operating to cut off power when the stop-button circuit is broken, provide a safeguard to personnel working on the plant. Main switches and circuit-breakers should be provided with means for padlocking in the 'off' position, to prevent the unauthorised closing of power circuits.

Sequence control is very useful on multiple machine and conveyor systems, but such systems must be fitted with means for independent running of units, to enable individual repairs and test-runs to be carried out without starting-up the whole plant.

Overhead bare conductors must be placed out of reach of the operators, bearing in mind any ladders or long metal tools which may be in use and which may give an operator the means of access to or contact with them. Bare conductors within reach from platforms must be guarded therefrom. If these conditions cannot be satisfied, other methods of power supply must be adopted, such as power plugs and rubber

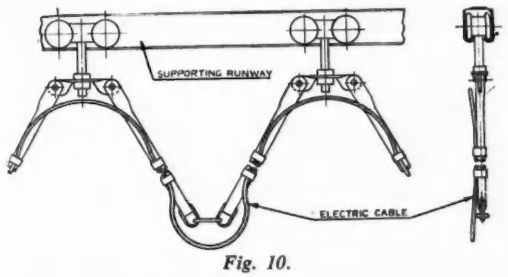


Fig. 10.

covered leads, automatic cable reels, under-floor conduit supply, or battery operation.

Trailing cables are prone to damage which may remain unnoticed and be dangerous to life afterwards, and under-floor conduit systems are expensive and vulnerable to water. Cable-reels are satisfactory for short runs if properly applied to the job, and battery operation gives good service provided that power requirements are not excessive. Enclosed bare wire systems and flexible tough rubber leads mounted upon folding linkages supported on overhead runways (Fig. 10) offer alternative methods of ensuring safety.

The retort house provides the most common use of overhead bare conductors, but bare-wire power supply is commonly fitted to overhead motorised hoist-blocks. At Bromley works such a hoist-block system has recently been converted to a simplified version of the all-insulated system shown in Fig. 10. For long straight runs, the linkages are included to relieve the power cables of the stresses involved in bunching and extending the cables as the carriage traverses the track, but in this case the travelling distance of 35 ft. permitted the use of the cable itself to carry these stresses, and the weight of the loops of cable was taken by a catenary wire in place of the trolleys and supporting track.

On bare conductor systems the carbon collector is rapidly replacing the wheel collector and gives greater area of contact, increased life, and reduced sparking.

The problem of power utilisation in buildings in which concentrations of inflammable gases and vapours may occur is receiving considerable attention. All flameproof gear is very costly and very heavy and, as power and lighting requirements increase, great difficulty is experienced in producing satisfactory flameproof equipment. In high-powered motors, alternative solutions have been put forward; one, to install a normal motor behind a gas-tight partition, and another to employ a totally-enclosed, fan-cooled machine, with its cooling air supplied by an external fan, separately driven, from a source of pure air at a pressure slightly higher than atmospheric. The first of these methods is difficult to apply in existing buildings, and the second requires a machine almost as expensive as a flameproof motor.

In buildings housing these high-powered machines the need for cranage facilities to effect repairs calls for increasing heights of roof to provide adequate headroom for cranes, and in such circumstances the provision of lighting to obtain modern standards of illumination requires extremely heavy roof-trusses to carry the weight of the flameproof lamps.

In these spheres the lot of the gas engineer is becoming very difficult, and the ideal solution has yet to be found.

Fuel Economy and Process Requirements

In many incidental matters, the contractor can achieve for his clients considerable increases in efficiency, particularly as regards the use of waste heat. In this respect the waste heat boiler has become an accepted and effective source of medium pressure steam for power purposes but much more should be done to utilise the latent heat of steam discharged to atmosphere from the exhausts of steam prime movers. In many cases the installation of condensers and cooling towers, with their auxiliary pumping plant, cannot be justified economically, but the steam exhausted to atmosphere can frequently be utilised in neighbouring heating systems with considerable saving, and at very little cost in equipment. The exhaust pressure of many prime movers may be raised by 5-20 lb./sq.in. with little effect upon their operation, and the provision of a relief valve close to the prime mover will safeguard the closing of the exhaust steam main to the heating application. Piping of large diameter should be used, to prevent undue loss in pressure, and runs should be kept as short as possible, with good provision for drainage of condensate. If condensate is to be returned to the boilers, which practice is highly desirable, then heat exchangers may be employed in the heating application to avoid contamination of the boiler water.

Comprehensive schemes of this nature are essentially the concern of the gas engineer, since they depend upon the favourable geographical locations of the plants concerned, but in many individual plants similar economies can be made and should be carefully considered in the initial stages of design. The relationship between initial cost and operational economies plays a vital part, and a local need for steam heating of adequate size may often decide the issue between the use of an electric motor or a back-pressure steam-driven prime mover utilising its exhaust steam for heating purposes.

Waste heat boiler designs achieve varying degrees of success in striking a compromise between compactness and ease of cleaning. Tube descaling becomes necessary in time, and while applications to existing plants often require a small shell diameter because of space considerations, provisions should be made as far as possible for easy descaling without removal of tubes.

Many modern plants generate steam in waste heat boilers which supply the plant requirements and feed surplus steam to the works mains. The arrangement of steam piping of such plants should provide for the supply of steam from the waste heat boiler directly to the main steam line and the feeding of steam to the plant through a separate connection from the main steam supply. In this way the steam service to the plant may be shut down without affecting the operation of the waste heat boiler. In water gas plants particularly, this

condition is most important, since running repairs to these plants are commonly carried out with the plant on standby and, under these conditions, the residual heat in the generator will continue to produce steam for a considerable time which must otherwise be blown to waste through the boiler safety valve.

Steam air-ejectors on condensing plant are seriously affected by small variations in steam pressure below their designed working pressure. Provision should be made on equipment of this nature to supply steam through a reducing valve, wherever pressure variation is likely to be experienced, and so enable steady vacuum to be maintained irrespective of the fluctuations of main steam pressure.

Serious losses are experienced through leaking steam valve glands, which cannot be packed in many cases without closing the valve and isolating vital portions of the plant. Greater use should be made of auxiliary gland-isolating valves incorporated in the main valve or spindle and arranged to isolate the gland from steam pressure when the main valve is wide open. Valves of this type can be packed at any time.

Condensation in works steam mains can be the cause of serious troubles unless adequately provided for. Trapping of all low points is essential, and to avoid carry-over of moisture from the main into the branches all branches should be taken from the top of the main.

Every branch from the works steam and water services should be fitted with a valve, to permit isolation of any service with a minimum of disturbance to the rest of the works. These valves should be located as close to the main as possible and should never be used to regulate supply pressure, being always wide open or fully closed.

The replacement of throttle valves on all steam prime movers should be easy to achieve without dismantling the service itself, and no valve should be mounted directly upon the studded flanges usually found on engines, turbines and pumps. A short flanged spacing-piece should be interposed between the valve and flange, so that the breaking of the joints alone is necessary to remove the valve from the main.

Design and Construction

(*a*) *Reinforced Concrete.*

The success of a reinforced concrete structure depends first upon the skill and experience with which the designer and his staff interpret the clients' requirements, to obtain a structure economical in its use of materials and realistic in its conception of practical constructional requirements. It is particularly true of gasworks conditions, however, that the success of reinforced concrete construction rests equally in the hands of the site foreman. A good foreman may achieve satisfaction in the careful construction of an indifferent design, but a second-rate foreman can very easily produce from a first-class design a structure which will show in the course of a few years cracks, rust-stains, and finally spalling of the surface, which must receive immediate attention if the structure is to be preserved. At Sydenham it has always been the practice to assign a supervisor to every reinforced concrete project, to ensure that all the points which can make or mar concrete construction are rigorously checked.

To avoid cracks and spalling, the first need is for adequate cover round the main steel, never less than 1 in. to the outside of the bar and increasing to 1½ in. for small columns and average size beams and 2 in. in large columns and beams. The steel should form a self-supporting cage with every bar tied and rigidly located and splices arranged to avoid long lengths of bar projecting from freshly-poured concrete, which must be specially steadied to prevent movement while the concrete is setting. No loose bars should ever be introduced.

Tightness of joints is a problem presenting considerable difficulty, and assistance can be given to the site foreman if a mix is specified containing the proportions: 1 cwt. cement, 2 cu. ft. sand, 4 cu. ft. shingle, corresponding to volumetric ratios of 1: 1¾: 3¾:, instead of the more usual 1: 2: 4 proportions.

Strength is very seriously affected by water content, and the concrete should contain only sufficient water to permit a sluggish flow round the steel. The pour should always require tamping to consolidate the mix round the steel and against the shutter faces and to produce a good finish, a dense concrete, and good bond with the reinforcement. Tamping should only be permitted for a short time after pouring.

Tamping is sometimes carried out with mechanical vibrators and requires still less water in the mix. The vibrators must always be kept on the move, to avoid local segregation of the mix. If excess water is present, surplus water rises rapidly to the top, carrying away with it appreciable quantities of cement and making it very difficult to check the truth of the finished surface.

The work involved in placing stiff concrete is laborious, and there is a constant tendency with any concreting gang to increase the water content and obtain easily flowing material. The slump test provides a check against this practice, but a little experience can very easily detect variations in plasticity by observation, and instant action can be taken to prevent a repetition on the next mix.

Accuracy of mix and quality of the aggregates must both be watched. The shingle should contain no soft, porous pieces, the sand should be sharp to the touch, and the use of a mix based upon the 1 cwt. bag of cement should always be adopted, preferably using measuring boxes for the aggregates.

Care must be taken to see that the reinforcement is free from mill scale, any serious degree of rusting, and contamination from dirt, tar, paint, &c., and before a lift is poured the reinforcement must be cleaned from all old concrete present upon it from previous pouring operations.

The steel fixer must ensure that his bars are so placed that the prescribed cover is obtained. To do this, it should be rigorously enforced that the bottom steel in floors be supported upon precast concrete blocks of the requisite thickness, concreted in, and not upon odd pieces of brick or timber, and that either circular asbestos-cement spacers or locating bars passing through the shuttering and withdrawn just before covering by the rising level of concrete are used in columns and beams to hold the steel in the correct position (Fig 11). There should be no projecting ends of ties near the shutters, and all ties should be made on the inside of the reinforcement The first appearance of rust stains can often be traced to the ends of tying wires which have been left touching the shuttering

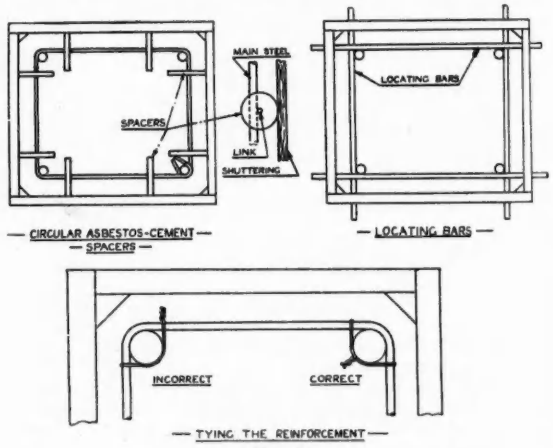


Fig. 11.

and which have corroded under moist atmospheric conditions. This corrosion, once started, ultimately reaches the main reinforcement, with resultant loss in strength of the member and damage by spalling of the concrete covering the main bars. Bars must be securely fixed, with main steel always nearer the surface than continuity steel, and with main bars of columns and beams pulled tightly into the corners of the links.

Shuttering should be erected in such a manner that the concrete is accessible to the concreting gang at all times, both to see what they are doing and to reach into any part if necessary, and should be fitted and faired as closely as possible to prevent loss of cement and to minimise marks on the finished surface. Contact of end grain of the timber with the concrete should

be avoided as far as possible, all internal and external corners should be provided with fillets, and the cover given to the main steel must be carefully checked.

Before concreting commences, the shuttering must be thoroughly cleaned out and any sawdust, wood chips, dirt, and other foreign matter removed.

An ever-present anxiety to the site foreman is the jointing of new concrete to old. Successful gastight and watertight joints are difficult to obtain unless the concrete is comparatively new, and thorough brushing and cleaning of the surface is

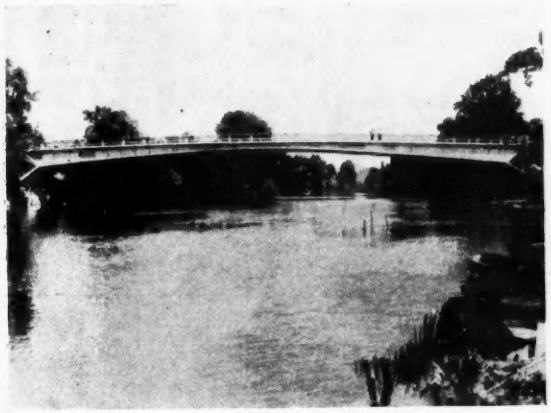


Fig. 12.

necessary. The insertion of steel or copper sealing strips about 6 in. wide in the joint provides an impervious seal, but unless great care is taken to consolidate the concrete round these strips moisture will percolate along the surface and ultimately find an outlet.

Special consideration has been given to the development of overhead concrete purifier boxes, which have enjoyed a reasonable degree of success. Experience provides several points, however, upon which the designer and site foreman must be particularly alert, if gastightness is to be maintained.

In designs utilising the sides of the boxes as load-carrying

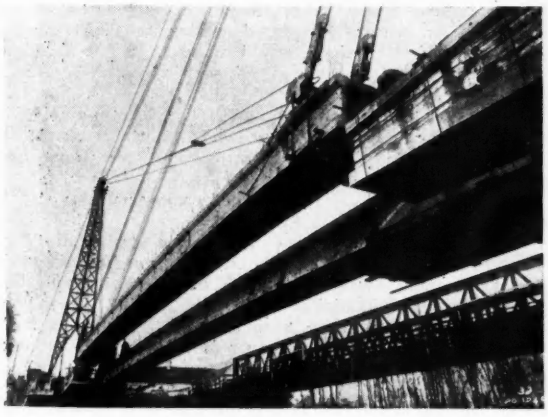


Fig. 13.

beams, from which is suspended the purifier bottom by vertical tension steel, leaks have developed in the joint between bottom and sides, owing to inadequate grip length of the tension bars. This design simplifies shuttering a little, but modifications are needed to ensure the development of adequate strength at this point.

Temperature cracking occurs to a limited degree, and some temperature steel should be included, 0.6% being considered a suitable proportion. A further safeguard is obtained by designing boxes in short lengths, upon relatively flexible columns.

Shrinkage cracks are best countered by reducing the number of joints to a minimum. The ideal method of construction, which, however, requires large quantities of shuttering, is to cast in one piece the bottom and sides, adding the top 24 hours afterwards. Good results have followed this practice in America. Precautions should, in any case, be taken to avoid fortuitous joints by insisting upon the presence on the site of a spare mixer, and the concreting programme should be planned so that jointing surfaces are as new as possible.

Precast concrete construction provides consistency of quality, surface finish, and dimensions from the more highly developed

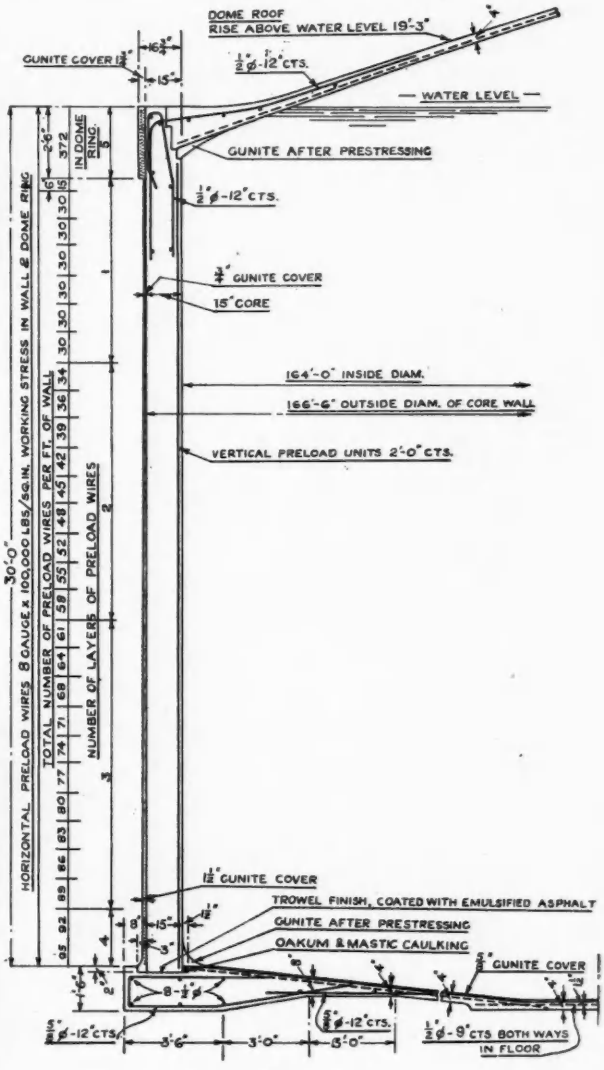


Fig. 14.

mould construction which may be employed when mass production of a component is envisaged, and high strength and rapid production is obtained with the use of low water-cement ratios and mechanical consolidation. The adoption of welding in the production of the steel reinforcement simplifies the practical difficulties of maintaining adequate cover.

Heavy precast sections are frequently made near the erection site, and gantry columns and beams carrying heavy static and rolling loads have been precast and afterwards erected by mobile crane, usually with grouted joints, in a number of factory buildings at home and abroad.

Prestressed construction has been applied in Great Britain only to a limited degree, and its design and construction are of a very specialised nature, using high stresses and high-tensile steel wire reinforcement. The designers' aim is to relieve the concrete of all tensile stresses and to eliminate the cracks through which penetration of air to the reinforcement can cause deterioration of the steel. The method economises in both steel and concrete and is adaptable to both in-situ and pre-cast construction. Abroad, particularly in France and Sweden, a number of applications of large size have been successfully completed, such as the Esbly bridge illustrated in Figs. 12 and 13, and in this country the method is showing signs of success in its application to railway sleepers and electric transmission poles, where the results compare very favourably with orthodox methods.

Prestressed construction has been applied extensively in the American chemical industry to the building of concrete tanks in sizes ranging up to 200 ft. and over in diameter, and the success of these applications directs the attention of the gas engineer to its possibilities as a method of constructing gas-holder tanks. The principle used is to wrap a thin-walled concrete tank with high-tensile steel wire under regulated tension, a finishing coat of gunited mortar being applied over the wrapping for protection. The tension in the steel wrapping induces compression stresses in the concrete of an intensity sufficient to nullify the effect of the loading applied when the tank is filled with water. Fig. 14 shows details of a typical water tank of prestressed construction, this example illustrating the additional strength at the top to take the stresses induced by the shell-

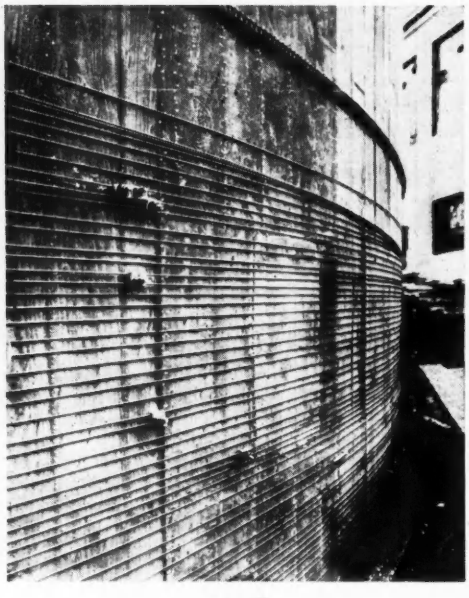


Fig. 15.

type roof which is a self-supporting dome 4 in. thick spanning the 164 ft. diameter tank without internal ties or ribs. Fig. 15 shows a close-up view of the prestressing wires applied to the outside of the tank wall, with safety clips fitted at intervals, which are removed when the gunited covering is applied. The barrel clip visible towards the right-hand side of the photograph secures the ends of two lengths of wire, and the chain wrapped round the tank at the top is the driving chain round which the wrapping machine is propelled. This machine is shown in Fig. 16 and runs round the tank, unreeling the wire as it goes and applying a constant tension to the wire through a die whose diameter regulates the tension applied. The machine automatically hoists itself up the tank as it rotates, and in this particular case is driven by compressed air. The rate of hoisting controls the number of wires laid per foot height of tank.

Railway sleepers are produced by tensioning the reinforcement on fixed drawbenches, assembling the moulds round the wires and pouring the concrete, cutting the wires after the concrete has set. The bond between steel and concrete is sufficient to prevent slip.

Similar methods are used on bridge beams, using either drawbenches or the moulds themselves to carry the prestressed loads. Alternatively, precast sections are assembled together with ropes of high-tensile steel wires passing through prepared holes, the ropes tensioned by jacks and permanently wedged against the concrete sections themselves and grouted in for protection. Figs. 12 and 13 show the prestressed Esbly Bridge which spans 275 ft. with a depth of 3 ft. at the centre. In Fig. 13 can be distinguished the joints between the precast sections of the bridge, the several arches of which the bridge was made being united after erection by transverse prestressing wires in a similar manner. The holes seen at intervals along both flanges of the bridge girders in Fig. 13 receive these wires and the wedges securing them after prestressing. Experience on bridge work indicates that these methods show economies over orthodox methods only when spans over 60 ft. are reached but applications justifying multiple-production techniques will undoubtedly produce many opportunities for economic use of these methods.

(*To be continued*)

STEAM EJECTORS — continued from p. 255

moisture and heat. It is generally recognised that a certain amount of moisture is desirable in the oxide mass, both from the point of view of activity and as a deterrent to hardening. The normal practice of positioning the washers immediately prior to the purifiers ensures that the gas passing to the purifiers is saturated at the outlet temperature of the washers. If, however, either dry air is added to the gas stream at this point or the gas is passed through a closed type of heater, or both conditions apply, then gas will no longer be saturated, and the oxide will have the tendency to become too dry. The steam ejector method has the merit of supplying warm, saturated air to the purifiers.

Ease of Control

The operation of this system is extremely simple and maintenance costs are practically nil. The volume of air supplied can be regulated by adjusting the compression of the spring of the steam reducing valve. A simple graph, such as that shown in Fig. 2, can be prepared relating the steam pressure at the ejector to the air flow, and reference to this facilitates alterations to cope with varying air requirements. The small inset scale on the graph is used to obtain the correct steam pressure setting to maintain a definite ratio of air to gas, in this case 2%, for various gas makes, without further calculation. In accordance with the general works policy, the steam pipes are efficiently lagged to conserve steam, and as a further economy this system could be worked on low pressure process steam where this is available.

The method described is not capable of controlling the temperature and moisture content of the gas throughout the purifiers to the same limits which could be obtained using inter-stage heaters and humidifiers, and therefore it is in no way suggested that steam ejectors should take the place of such plant. The purpose of this paper is to describe a method which can be applied to existing plant without a great deal of trouble and therefore might be of use to the smaller works or those depending on several streams of comparatively small purifiers. The graph given in Fig. 2 refers only to one particular installation and for this reason steam consumption has not been given.

It has been our experience that prior to the use of the steam ejectors and in the absence of any form of live steam admission the oxide in the purifiers definitely dried out, in some cases the moisture content being less than 2% on discharge. The use of the ejectors has checked this tendency, but at the same time has not caused the purifier drainings to become excessive. Investigation has shown that the condensed steam in excess of that required to saturate the gas at the higher temperature is deposited in the syphon pot in the purifier inlet main.

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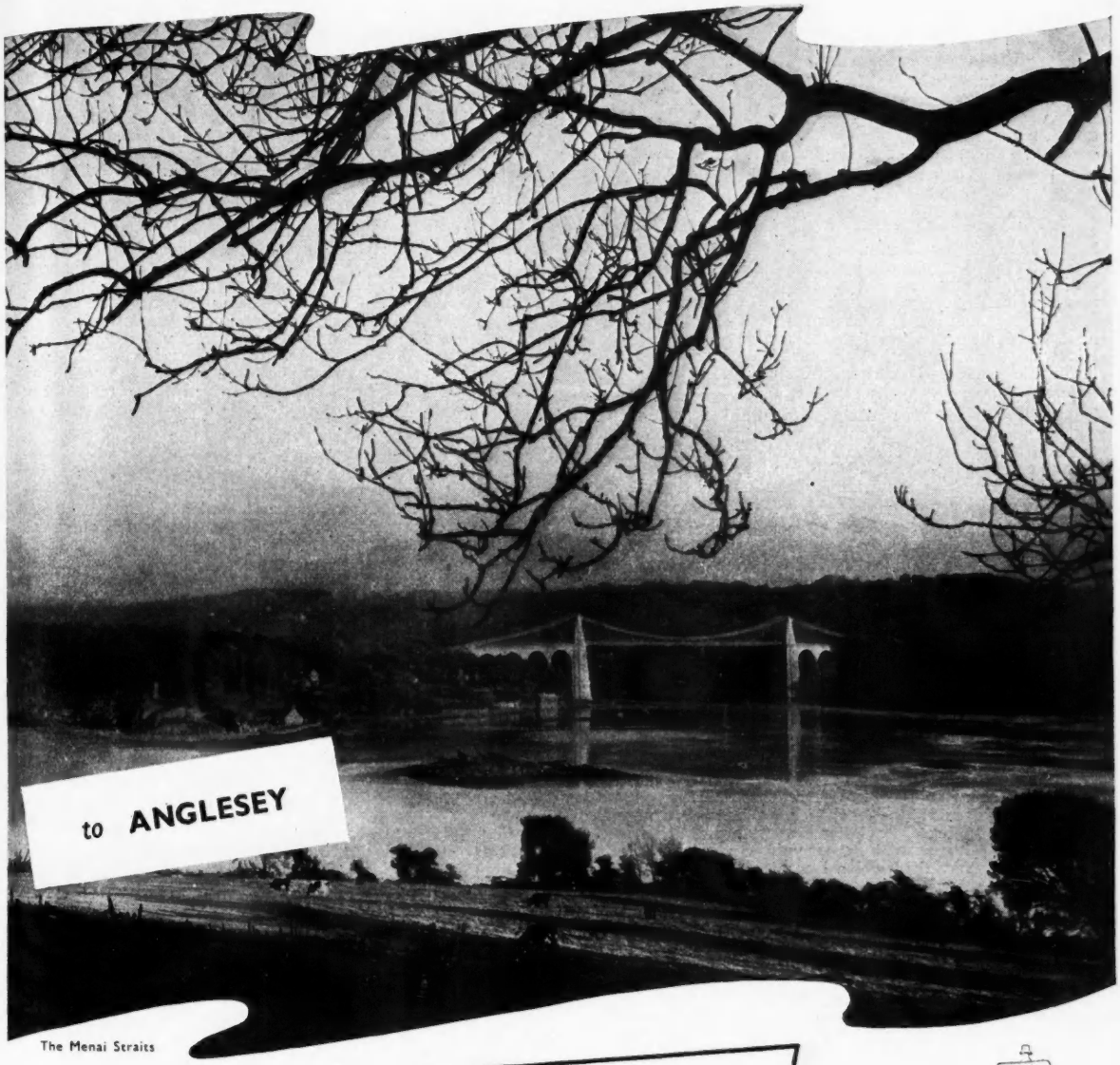

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COMPANY MEETING

GLOVER & MAIN, LTD.

Statement by the Chairman to the Shareholders

At the Annual General Meeting of Glover and Main, Ltd., held at 48, Grosvenor Gardens, London, S.W.1, on, April 20, 1950, the Chairman, Colonel W. R. Glover, C.M.G., D.S.O., said :—

Before dealing with the activities of the Company as a whole, I feel I must refer to the loss we have all sustained by the death of our friend and former Chairman, Sir Ernest Hiley, who passed away in July last. A tribute was paid to his memory at the Extraordinary General Meeting held in October, but as this is the first Annual General Meeting since his death, I should like to take the opportunity of recording our appreciation of his valuable services. He joined the Board in 1934, was appointed Deputy Chairman in 1939 and succeeded the late Mr. Kenneth Aird as Chairman in 1941. From then on he devoted all his energies to the affairs of your Company. His wide knowledge of commercial and legal matters was invaluable to us, and we deeply regret his loss.

The accounts for the past year, which are already in your hands, have been prepared so as to afford easy comparison with those for 1948. I do not, therefore, propose to deal with them in detail but I feel sure that you will consider, as I do, that the trading result for 1949 is most gratifying. The final surplus, after making allowance for taxation and sundry adjustments, is £293,265.

This result has been achieved by increased turnover throughout the Group, and has been secured in the face of costs which have been and still are rising, and which have forced us to maintain our prices instead of lowering them in favour of the consumer—a policy which has always been and still is our aim. In fact, I think I am right in saying that, on the cooker side of our business, we are the only firm engaged in large-scale production which has not made a general price increase during the last four years.

Record Output of Meters.

So far as the year under review is concerned, the output of meters has reached an all-time record, and although the cooker output has been limited by reason of the shortage of steel, I think we can consider the results achieved as being more than satisfactory. In regard to water heaters, production here has been seriously hampered by the continuance of purchase tax, the complete removal of which I consider absolutely essential; a supply of hot water in every home is not a luxury, but a necessity. It is most regrettable that we see no signs of economy in Government expenditure which would help to make the abolition of this tax possible.

In order to take our part after the war in the export drive, we opened a separate organisation to control this side of our business. During the last two years we have been designing appliances especially for this market, and it is hoped that these will help to augment our sales abroad during 1950. We have built up our organisation in many parts of the world, and are now dealing with a good proportion of the export sales in the industry. Our subsidiaries have still further increased their exports during the past year, although they have been generally hampered by exchange restrictions and the difficulty of obtaining import licences. Both these factors have also adversely affected the trading of our European subsidiary.

Research and development work is making a great contribution to production at our various factories. We have augmented this side of our organisation since the war, and anticipate further expansion in the future. We have taken a long-term view, which I am sure is the right one, by building up a strong research team, covering the many appliances we now market, which will enable us to keep in the forefront of design.

Buildings, plant and machinery have been well maintained. It is just as well to point out, however, that the additional initial allowance on purchases of plant granted in the 1949 Budget only enables industry to claim an immediate relief of 40%. This does not increase the total allowances needed to cover the higher replacement cost of new plant which is today at least two or three times the pre-war figure. The balance has to be found out of the year's surplus, which itself has to bear income and profits tax. To finance this, and also hold sufficient stocks for current production, bearing in mind their increased value, means that we must retain in the business a considerably increased working capital. This is a strain under which all industry is struggling. Fortunately, a wise policy in the past has put your Company in a good position to meet that strain, but it is an unhealthy condition which must be eliminated if the country as a whole is to retain and improve its position in world trade.

The Town and Country Planning Act, with all its restrictions, is a further handicap to efficient and economic development. Many years ago we provided land for expansion. In the past we could freely increase our building area in any of our factories to meet the additional demand for our products. Now, before we can plan a new programme of extensions, many and various authorities have to be first consulted and their sanction obtained, with all the attendant vexatious delays and expense. In addition, we may be faced with the heavy liability of a development charge. This is, in fact, a deterrent to any expansion and a tax on enterprise.

Problems of Management.

The great increases made in the output of all our products since the war have been more than maintained during 1949, and there is a steady and strong demand for your Company's products. I must emphasise, however, that we shall be operating against a sombre background of high taxation, increasing costs, and restricted quantities of materials, all of which increase the problems of management and make it difficult for us to plan our production as we would wish, so as to ensure efficient results and continuity of employment for all our workpeople.

It gives me great pleasure to state that there have been no stoppages which have seriously affected our production, and my colleagues and I are satisfied that the loyal co-operation between management, staff and employees has contributed very largely to the success of the year's trading. On your behalf I should like to thank all concerned for their efforts so well sustained.

The report and accounts were adopted.

VERIFICATION OF TESTING MACHINES

A new British Standard has been issued for the verification of testing machines (B.S. 1610—Pt. I : 1950). This reports that advances in recent years in the efficient use of engineering materials, with the concurrent increase in the use of hydraulically operated and multi-lever testing machines, have resulted in the need for standard methods of verifying testing machines and the grading of these machines in terms of the maximum permissible errors.

The advantages of verifying machines under load, that is, in the condition in which they will be used, must be obvious, but it has not always been possible to do this in the past.

It is now possible, due to the production of high precision portable load measuring devices, to test under load many machines that could not previously be tested to the requisite degree of accuracy; particularly since the installation of the 50-ton dead weight primary standard of load at the National Physical Laboratory is now available for calibrating these load-measuring devices.

Section A deals in general terms with methods of load verification by (a) standardised weights, (b) proving levers, (c) elastic devices, (d) test samples, and (e) combination of linear measurements and load. Section B deals with tensile and compression machines, laying down specific requirements as to the range over which the machine may be verified, the procedure to be followed, grading and certification of the verification.

Copies can be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1, price 2s., post free.